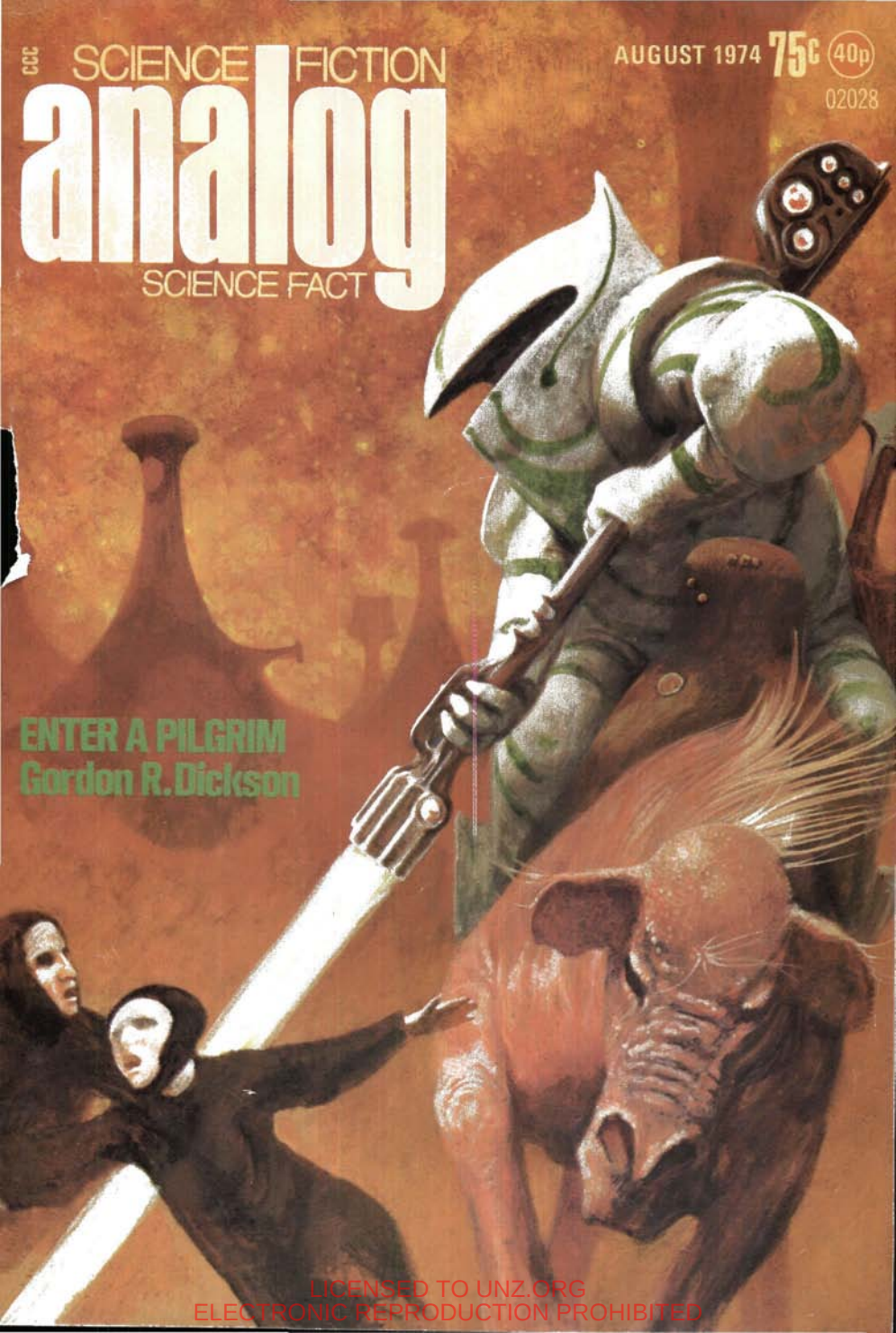

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A Calendar of Upcoming Events

August 19-August 22, 1974:
American Astronomical Society, 143 Meeting at University of Rochester, Rochester, New York. Info: L.W. Frederick, Leander-McCormick Observatory, Box 3818 University Station, Charlottesville, Virginia 22903.

August 19-August 23, 1974:
Conference on Tradition and Change in Physics Graduate Education at Pennsylvania State University, State College PA (APS/AAPT). Info: Martin L. Perl, SLAC, Stanford University, Stanford, California 94305; or Roland H. Good, Jr., Physics Department, 104 Davey Building, Pennsylvania State University, University Park, Pennsylvania 16802.

August 21-August 23, 1974:
Engineering in the Ocean Environment Conference at Halifax, Nova Scotia, Canada (IEEE). Info: Ocean '74, Box 1006, Halifax, Nova Scotia, Canada.

August 23-August 25, 1974:
AGACON 74 (13th DeepSouthCon) at the Sheraton Biltmore Hotel, Atlanta, Georgia. Registration $7.50. Full-time "Mardi-Gras" costume conference—no program. A registration discount will be given to those arriving at the con in costume. Special guests: Thomas Burnett Swann, Poul Anderson, Joe Green, Gerald W. Page. Info: Joe Celko, Box 11023, Atlanta, Georgia 30310.

August 29-September 2, 1974:
DISCON II (32nd World SF Convention) at the Sheraton-Park, Washington, DC. Guest of Honor, Roger Zelazny; Fan Guest of Honor, Jay Kay Klein. The SF Achievement Awards (Hugos) will be presented. Registration: $3 nonattending, $5 attending. Info: Discon II, Box 31127, Washington, DC 20031.

October 31, 1974:
Deadline for entries in the New England SF Association science fiction short story contest. Info: NESFA, Box G, MIT Branch, Cambridge, Massachusetts 02139.

—ANTHONY R. LEWIS

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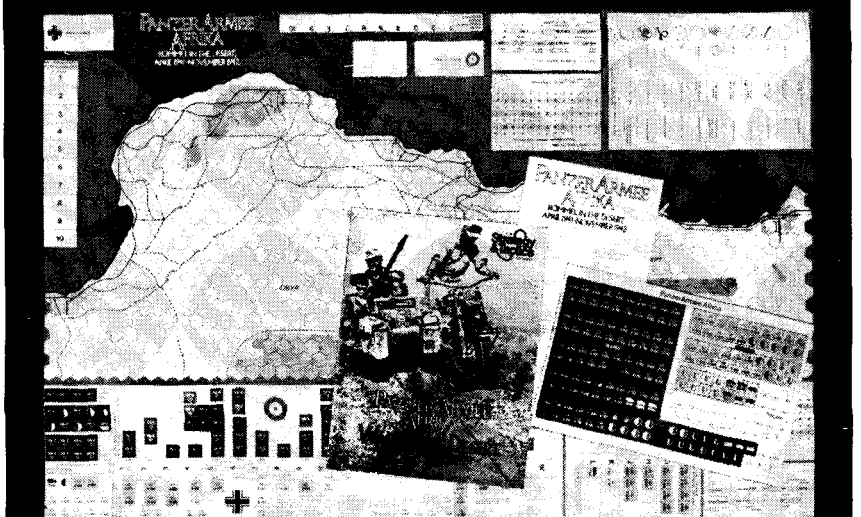

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citizens of the WORLD

editorial

Where are the citizens of the world?

In story after story, science-fiction writers tacitly assume that this entire planet will eventually be united into a single world government. Many stories see this happening before the end of this century—certainly within the next hundred years.

If this is true, then we should be able to identify some trends at work today leading toward a unified world government. There should be at least a few people alive today who consider themselves citizens of the world, rather than citizens of a single nation.

With the exception of a *very* few idealists, every human being on this planet gives his political allegiance to nothing "higher" than a nation-state. There are even some primitive societies here and there in which the individual's highest allegiance goes to his tribe or clan. In many areas, such as Southeast Asia, the true allegiance of most of the people is to their village; the only relationship they have with a national government is an occasional tax-collector, or soldiers who turn their rice paddies into battlefields.

For us sophisticated Westerners, the strongest political allegiance we profess is to our nation. We consider ourselves to be Americans, or Englishmen, or Germans, Canadians, Russians, Israelis, Australians, et cetera. No more than a handful of the 3.8 billion of us think of ourselves as Terrans, or world-citizens. And even so, we may *say* that we think of ourselves as human beings first and national citizens second, but we *act* as if the citizens of other nations are something less than truly human. Our policies of trade and commerce, finance, politics, even our attitudes toward the Olympic Games, show the force of nationalism. Buy American! See America first! Don't sell America short! America, love it or leave it!

Nor is nationalistic zeal an especial curse of the industrialized West. The emerging nations of Africa and Asia burn with fierce nationalistic ambition. How else can

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an educated elite bring a gaggle of villagers and tribesmen into the Twentieth Century in one culture-spanning leapfrog bound? Just as the Tudors of England and the Bourbons of France built nations out of medieval patchworks of baronies, the leaders of the emerging nations are trying to turn loosely-confederated tribes into unified nations, and using the power, prestige and pride of nationalism to do it.

What about the next step? How can a world divided into nations become a unified political entity? Would a nation such as the US, or USSR, or Zaire (for that matter) surrender any of its sovereignty to a world government?

Alexander Hamilton had the answer to that question some two hundred years ago: "Do not expect nations to take the initiative in imposing restrictions upon themselves," he said.

In other words, *no* national government is going to voluntarily give up any of its power to a supra-national instrumentality. People have complained for a generation or more that the United Nations is little more than a debating society; it has no real power in the arena of international politics. Right on. But this is true because the nations that created the UN built powerlessness into its very foundations. How well would the US Government work if one state in the Union could nullify any piece of Federal legislation simply by casting a veto? We fought a bloody Civil War to ensure the supremacy of the Federal Government over the states' rights, and we still have legal wrangles about the subject. The UN is effectively powerless because any member of the Security Council can veto almost any action. And it was precisely the most powerful nations, including the US, that wrote the veto power into the UN Charter.

The few idealistic persons who have proclaimed themselves "citizens of the world" haven't brought about a step forward in international cooperation. In fact, by renouncing their citizenship in any particular nation, they became legally stateless persons. This means that they have no citizenship anywhere on the planet! They have no legal residence, no voting privilege, no passport, no civil rights. They are literally exiles from every nation on Earth. Without citizenship in a nation, an individual human being has no legal protection or rights anywhere. He is as helpless as a Paleolithic hunter who belonged to no tribe: a single, frail human being all alone in a cold and dangerous world.

Momentarily leaving aside the question of whether or not it's *desirable* to have a unified world government, let's examine world political trends to see if there are any motions in that direction identifiable today.

Clearly, the influence of modern

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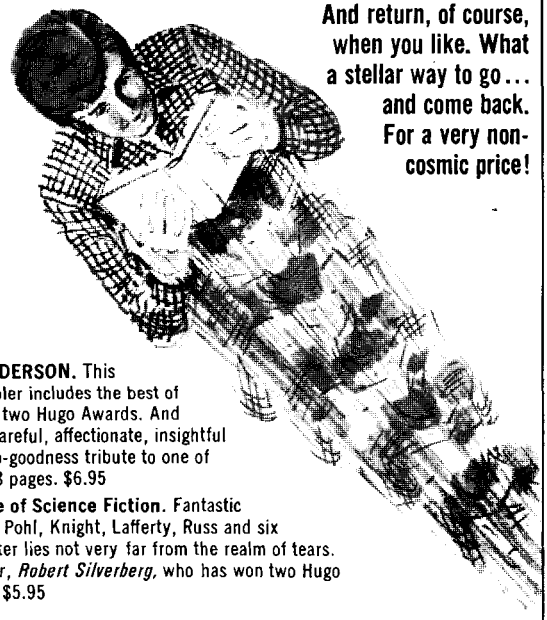
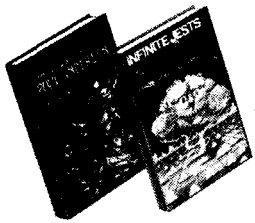


TWO NEW GREATS



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technology has been to unite the peoples of the world socially and culturally. Electronic communications, in McLuhan's phrase, has turned the world into a "global village." Diplomats can fly at transsonic speeds from one capital to another, shuttling back and forth over more mileage in a single day than Talleyrand covered in a lifetime. Rock singers are instantly known all over the world. Western clothing styles, business methods, and social attitudes can be found from Tokyo to Timbuktu.

Spearheaded by our science-based technology, Western culture has homogenized most of the world. All the industrialized nations and most of the emerging ones have adopted a Westernized form of society.

But what is happening politically? There was some movement toward supranational groupings, spurred by the Cold War. The West's NATO and the East's Warsaw Pact were more than military alliances, in theory, although the confrontation between the US and USSR was the driving force behind these supranational groupings, and military considerations have always been foremost in both organizations.

The Western European nations have established the European Economic Community, the so-called Common Market. And the Warsaw Pact nations have made similar economic arrangements among themselves. While this started off with impressive momentum and was greeted (mainly in the US) as a step toward a United States of Europe, the EEC and similar international organizations have done very little to bring the nations of Europe together *politically*. In fact, viewed strictly from an American viewpoint, the Common Market has been a step toward European provincialism, a technique by which the European nations have reduced their economic dependence on the US.

Even if a United States of Europe eventually did come about, it would still be much less than the true North Atlantic community originally envisioned in the founding of NATO

Most science-fiction writers have predicted that political union among nations will come eventually, but only after modern technology has paved the way by firmly uniting the nations economically and socially. "First the scientists, then the engineers, the financiers, the businessmen, and finally—'way behind—the politicians." That has been the standard wisdom.

How far behind are the politicians? A decade? A generation? A century? How far behind *can we afford to have them*, when they have their fingers on the buttons of H-bomb-armed ICBMs? In a world simmering with wars, with vast armaments, with growing economic gaps between the rich and poor,

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with steadily rising population and steadily dwindling resources, how much longer can we afford to remain separated into nation-states?

Most historians agree that the most brilliant civilization on Earth, prior to our modern age, was that of ancient Greece. Many feel that the Greeks, especially the Athenians, produced the highest civilization humankind has yet seen.

Yet that beautiful culture was submerged by relative barbarians. The Macedonians, and later the Romans, conquered all of Greece and ended the glory of Athens and the other Greek city-states. True, Greek culture permeated the conquerors, and Greek learning was the epitome of Roman civility. *Yet the wisdom of the Greeks never advanced any further than it had reached at the time of Aristotle.* And Aristotle was the tutor of Alexander of Macedon, who was the son of Philip, the Macedonian king who conquered Athens and all the other Greek city-states. The brilliant and beautiful Greek culture stagnated under Macedonian and Roman rule. Would it have advanced further if left free? Would there have been a scientific revolution fifteen hundred years before Copernicus and Galileo? Impossible to say.

But this much we do know for certain. No citizen of Athens thought of himself as a Greek. He was an Athenian. There were no Greeks. There were Spartans and

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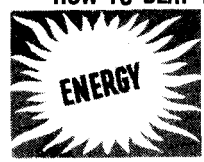

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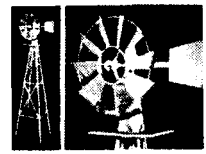

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Thebans and Corinthians. No citizen of the Greek city-states had a political allegiance higher than that to his city. They could band together temporarily to fight off invaders. But when a handful of Athenians, Spartans, *et al.* threw the full might of the Persian Empire back into Asia, the victors never realized that—united—they were the most powerful force in the world. They went back to their separate cities, and resumed squabbling among themselves. They destroyed themselves with internecine strife. The Macedonians conquered an exhausted Athens.

To paraphrase Santayana, those who ignore the lessons of history are doomed to repeat the mistakes.

The civilization of ancient Greece disappeared in large part because the Greek people never developed a loyalty to any political entity higher than their cities. Much of Greek culture was preserved in Asia and Rome, but it was a stagnant, dead culture that was preserved. Not until the Copernican Revolution and the development of the modern scientific method of thought, some fifteen hundred years after Aristotle, did human civilization truly move forward again.

Today we live in a world where loyalty to nation-states is the highest political allegiance we can achieve. Yet it is clear that the problems of nationalism now outweigh the advantages. How can Americans, Russians, Danes, Chinese, Brazilians, and all the rest begin to work together as citizens of the world?

Make no mistake about it. Nationalism has been one of the most powerful forces in human affairs for the past several centuries. It has served us well. It has provided a framework for the development of societies on continental scales, and empires of global proportions. But today, in an age threatened with nuclear war, overpopulation, and resource depletion, nationalism worsens our most dangerous problems.

Perhaps the most frightening aspect of the situation is that there is literally no code of ethics for nations. Despite fine words about international law, justice, world opinion, the UN, the World Court—the truth is that Uruguay can declare war on Iceland, if their government decides to, and nobody can stop them with anything short of military force, if the Uruguayans are truly determined to have their war.

That example seems farfetched? Then look at the nation of Rhodesia. This former British colony practices a form of racial discrimination against blacks that has been condemned by Great Britain, the United Nations, and most of the nations of Africa and Asia. Economic sanctions have been used against Rhodesia to try to force its Government to change its policies. Yet Rhodesia maintains its course,

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despite all the pressures put upon it. For there is no legal way to make a national government do anything that it doesn't want to do. Military force is the only method that works for sure, and then it works only if you win, and it wins only if you kill many of the people you're trying to change.

Perhaps this is good. It might be frightening if a world government could meddle in the affairs of every nation. Of course, we know we're *right* about Rhodesia. But suppose a world government decided to straighten out America's educational system and achieve true racial balance in all of this nation's schools? As John Campbell put it, whose ox would be getting gored then?

Biological forces are extremely conservative. The basic motivating force among living creatures seems to be: do it today exactly as you did it yesterday, if it worked then it should work now. Human societies are very complex biological entities, but they follow this basic conservative rule. They change slowly, and *very* reluctantly.

Yet the human race is the result of an amoeba trying to reproduce itself exactly. Biological organisms do change. And so do societies. Sooner or later there will be a world government, and the seeds exist today, in our technology, in our growing interdependence with all the peoples of this globe.

The energy crisis shows that

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world government is necessary. And that it is being formed, before our eyes.

The basic facts of the energy crisis seem clear:

1. There are enormous resources of fossil fuels still available: a century's worth of oil, at least, in the Middle East alone, for example.

2. There are many, many new technological developments available to decrease our dependence on dwindling fossil fuel supplies and open the door to limitless, clean sources of energy such as solar power and thermonuclear fusion.

3. The social and political structures governing our use of natural resources and development of new technologies are faltering long before there is any real physical shortage of the resources themselves.

In other words, there is not yet a true shortage of oil. But the international political arena has been manipulated in such a way that the oil of the Middle East has been denied to the consumers of the industrialized nations.

There are many Americans who feel that the manipulations were made, in part or in whole, by the managements of the major international oil companies. Either they took advantage of the Arab-Israeli war, or fomented it, to help drive up the price of oil—and their profits.

Heinous. Yet the barons of Merrie Olde England thought rather poorly of King John, too. While Richard Coeur de Lion was a good old buddy of theirs, nasty John was doing nothing less than taking the first steps in creating a nation out of a gaggle of petty baronies. For this they forced him to sign the Magna Charta, which the barons believed would ensure their privileges forever.

Could it be that the nasty oil companies, and nasty ITT, and the other multinational corporations are taking the first painful steps toward a world community? For reasons that are no more exalted than simple greed?

It certainly looks as if the oil companies have scored a decisive victory over the Government of the United States. They are getting their way, while we the people pay their price and our Government flounders. Of course, this may be a special situation that won't repeat itself, but if you hold the situation up in a certain light, you can see that Aramco and friends have done something that Nazi Germany and Imperial Japan were never able to do: the oil companies have dictated their will to our Government.

There may be many more citizens of the world than we imagine. And they are sitting in the board rooms of the multinational corporations. It's not a pleasant thought, perhaps. But what will next century's history books have to say about it? Or next year's science-fiction stories? THE EDITOR

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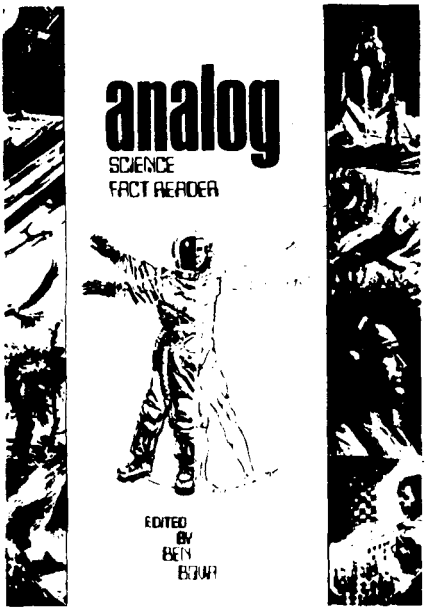

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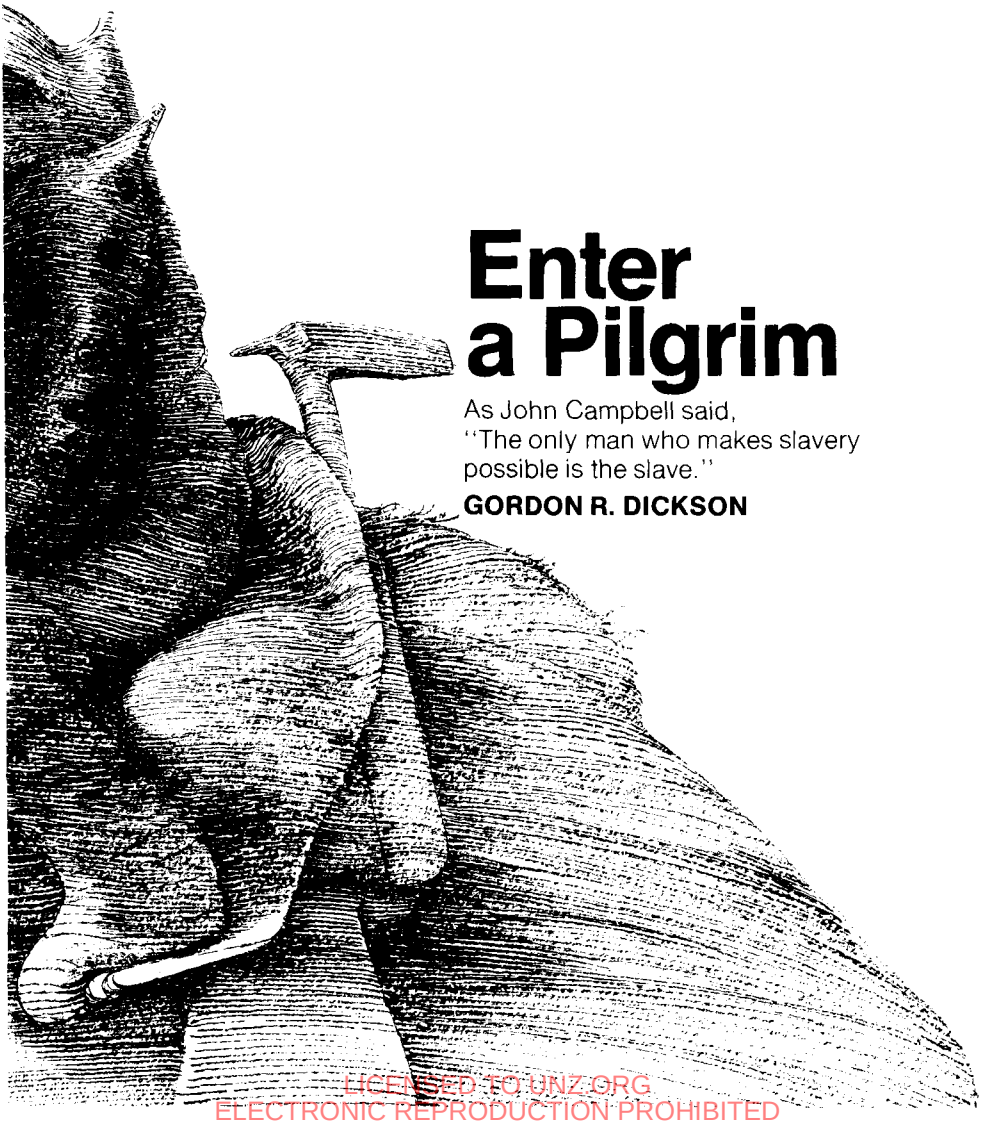

Enter a Pilgrim

As John Campbell said,
"The only man who makes slavery possible is the slave."

GORDON R. DICKSON

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In the square around the bronze statue of the Cymbrian bull, the crowd was silent. The spring sky over Aalborg, Denmark was high and blue; and on the weather-grayed red brick wall of the building before them a man was dying upon the triple blades, according to an alien law. The two invokers, judges and executioners of that law sat their riding beasts, watching, less than two long paces from where Shane Evert stood among the crowd of humans on foot.

"My son," the older and bulkier of the two was saying to the younger in the heavy Aalaag tongue, plainly unaware that there was a human nearby who could understand him, "as I've told you repeatedly, no creature tames overnight. You've been warned that when they travel in a family the male will defend his mate, the female and male defend their young."

"But, my father," said the younger, "there was no reason. I only struck the female aside with my power-lance to keep her from being ridden down. It was a consideration I intended, not a discipline or an attack . . ."

Their words rumbled in Shane's ears and printed themselves in his mind. Like giants in human form, medieval and out of place, the two massive Aalaag loomed beside him, the clear sunlight shining on the green and silver metal of their armor and on the red, camel-like creatures that served them as riding animals. Their concern was with their conversation and the crowd of humans they supervised in this legal deathwatch. Only slightly did they pay attention to the man they had hung on the blades.

Mercifully, for himself as well as for the humans forced to witness his death, it happened that the Dane undergoing execution had been paralyzed by the Aalaag power-lance before he had been thrown upon the three sharp lengths of metal protruding from the wall twelve feet above the ground. The blades had pierced him while he was still unconscious; and he had passed immediately into shock. So that he was not now aware of his own dying; or of his wife, the woman for whom he had incurred the death penalty, who lay dead at the foot of the wall below him. Now he himself was almost dead. But while he was still alive all those in the square were required by Aalaag law to observe.

". . . Nonetheless," the alien father was replying, "the male misunderstood. And when cattle make errors, the master is responsible. You are responsible for the death of this one and his female—which had to be, to show that we are never in error, never to be attacked by those we have conquered. But the responsibility is yours."

Under the bright sun the metal on the alien pair glittered as ancient and primitive as the bronze

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statue of the bull or the blades projecting from the homely brick wall. But the watching humans would have learned long since not to be misled by appearances.

Tradition, and something like superstition among the religionless Aalaag, preserved the weapons and armor of a time already more than fifty thousand Earth years lost and gone in their history, on whatever world had given birth to these seven-foot conquerors of humanity. But their archaic dress and weaponry were only for show.

The real power of the two watching did not lie in their swords and power-lances; but in the little black-and-gold rods at their belts, in the jewels of the rings on their massive forefingers, and in the tiny, continually-moving orifice in the pommel of each saddle, looking eternally and restlessly left and right among the crowd.

". . . Then it is true. The fault is mine," said the Aalaag son submissively. "I have wasted good cattle."

"It is true good cattle have been wasted," answered his father, "innocent cattle who originally had no intent to challenge our law. And for that I will pay a fine, because I am your father and it is to my blame that you made an error. But you will pay me back five times over because your error goes deeper than mere waste of good cattle, alone."

"Deeper, my father?"

Shane kept his head utterly still within the concealing shadow of the hood to his pilgrim's cloak. The two could have no suspicion that one of the cattle of Lyt Ahn, Aalaag Governor Of All Earth, stood less than a lance-length from them, able to comprehend each word they spoke. But it would be wise not to attract their attention. An Aalaag father did not ordinarily reprimand his son in public, or in the hearing of any cattle not of his own household. The heavy voices rumbled on and the blood sang in Shane's ears.

"Much deeper, my son . . ."

The sight of the figure on the blades before him sickened Shane. He had tried to screen it from him with one of his own private imaginings—the image he had dreamed up of a human outlaw whom no Aalaag could catch or conquer. A human who went about the world anonymously, like Shane, in pilgrim robes: but, unlike Shane, exacting vengeance from the aliens for each wrong they did to a man, woman, or child. However, in the face of the bloody reality before Shane on the wall, fantasy had failed. Now, though, out of the corner of his right eye, he caught sight of something that momentarily blocked that reality from his mind, and sent a thrill of unreasonable triumph running through him.

Barely four meters or so, beyond and above both him and the riders on the two massive beasts, the sag-

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ging branch of an oak tree pushed its tip almost into the line of vision between Shane's eyes and the bladed man; and on the end of the branch, among the new green leaves of the year, was a small, cocoon-like shape, already broken. From it had just recently struggled the still-crumpled shape of a butterfly that did not yet know what its wings were for.

How it had managed to survive through the winter here was beyond guessing. Theoretically, the Aalaag had exterminated all insects in the towns and cities. But here it was; a butterfly of Earth being born even as a man of Earth was dying—a small life for a large. The utterly disproportionate feeling of triumph sang in Shane. Here was a life that had escaped the death sentence of the alien and would live in spite of the Aalaag—that is, if the two now watching on their great red mounts did not notice it as it waved its wings, drying them for flight.

They must not notice. Unobtrusively, lost in the crowd with his rough gray pilgrim's cloak and staff, undistinguished among the other drab humans, Shane drifted right, toward the aliens, until the branch-tip with its emerging butterfly stood squarely between him and the man on the wall.

It was superstition, magic . . . call it what you liked, it was the only help he could give the butterfly. The danger to the small life now beginning on the branch-tip should, under any cosmic justice, be insured by the larger life now ending for the man on the wall. The one should balance out the other. Shane fixed the nearer shape of the butterfly in his gaze so that it hid the further figure of the man on the blades. He bargained with fate. I will not blink, he told himself; and the butterfly will stay invisible to the Aalaag. They will see only the man. . . .

Beside him, neither of the massive, metal-clad figures had noticed his moving. They were still talking.

". . . in battle," the father was saying, "each of us is equal to more than a thousand of such as these. We would be nothing if not that. But though one be superior to a thousand, it does not follow that the thousand is without force against the one. Expect nothing, therefore, and do not be disappointed. Though they are now ours, inside themselves the cattle remain what they were when we conquered them. Beasts, as yet untamed to proper love of us. Do you understand me now?"

"No, my father."

There was a burning in Shane's throat; and his eyes blurred, so that he could hardly see the butterfly, clinging tightly to its branch and yielding at last to the instinctive urge to dry its folded, damp wings at their full expanse. The wings spread, orange, brown and black—like an omen, it was that species of

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sub-Arctic butterfly called a "Pilgrim"—just as Shane himself was called a "Pilgrim" because of the hooded robe he wore. The day three years gone by at the University of Kansas, rose in his mind. He remembered standing in the student union, among the mass of other students and faculty, listening to the broadcast that announced the Earth had been conquered, even before any of them had fully been able to grasp that beings from a further world had landed amongst them. He had not felt anything then except excitement, mixed perhaps with a not unpleasant apprehension.

"Someone's going to have to interpret for us to those aliens," he had told his friends, cheerfully. "Language specialists like me—we'll be busy."

But it had not been *to* the aliens; it had been *for* the aliens, for the Aalaag themselves, that interpreting had needed to be done—and he was not, Shane told himself, the stuff of which underground resistance fighters were made. Only . . . in the last two years . . . Almost directly over him, the voice of the elder Aalaag rumbled on.

". . . To conquer is nothing," the older Aalaag was saying. "Anyone with power can conquer. We rule—which is a greater art. We rule because eventually we change the very nature of our cattle."

"Change?" echoed the younger.

"Alter," said the older. "Over their generations we teach them to love us. We tame them into good kine. Beasts still, but broken to obedience. To this end we leave them their own laws, their religions, their customs. Only one thing we do not tolerate—the concept of defiance against our will. And in time they tame to this."

"But—always, my father?"

"Always, I say!" Restlessly, the father's huge riding animal shifted its weight on its hooves, crowding Shane a few inches sideways. He moved. But he kept his eyes on the butterfly. "When we first arrive, some fight us—and die. Later, some like this one on the wall here, rebel—and likewise die. Only *we* know that it is the heart of the

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beast that must at last be broken. So we teach them first the superiority of our weapons, then of our bodies and minds; finally, that of our law. At last, with nothing of their own left to cling to, their beast-hearts crack; and they follow us unthinkingly, blindly loving and trusting like newborn pups behind their dam, no longer able to dream of opposition to our will."

"And all is well?"

"All is well for my son, his son, and his son's son," said the father. "But until that good moment when the hearts of the cattle break, each small flicker of the flame of rebellion that erupts delays the coming of their final and utter love for us. Inadvertently here, you allowed that flame to flicker to life once more."

"I was in error. In the future I will avoid such mistakes."

"I shall expect no less," said the father. "And now, the man is dead. Let us go on."

They set their riding beasts in motion and moved off. Around them, the crowd of humans sighed with the release of tension. Up on the triple blades, the victim now hung motionless. His eyes stared, as he hung there without twitch or sound. The butterfly's drying wings waved slowly between the dead face and Shane's. Without warning, the insect lifted like a colorful shadow and fluttered away, rising into the dazzle of the sunlight above the square until it was lost to the sight of Shane. A feeling of victory exploded in him. Subtract one man, he thought, half-crazily. Add, one butterfly—one small Pilgrim to defy the Aalaag.

About him, the crowd was dispersing. The butterfly was gone. His feverish elation over its escape cooled and he looked about the square. The Aalaag father and son were more than halfway across it, heading toward a further exiting street. One of the few clouds in the sky moved across the face of the sun, graying and dimming the light in the square. Shane felt the coolness of a little breeze on his hands and face. Around him now, the square was almost empty. In a few seconds he would be alone with the dead man and the empty cocoon that had given up the butterfly.

He looked once more at the dead man. The face was still, but the light breeze stirred some ends of long blond hair that were hanging down.

Shane shivered in the abrupt chill from the breeze and the withdrawn sun-warmth. His spirits plunged, on a sickening elevator drop into self-doubt and fear. Now that it was all over, there was a shakiness inside him, and a nausea . . . he had seen too many of the aliens' executions these last two years. He dared not go back to Aalaag Headquarters feeling as he did now.

He would have to inform Lyt Ahn of the incident which had de-

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layed him in his courier duties; and in no way while telling it must he betray his natural feelings at what he had seen. The Aalaag expected their personal cattle to be like themselves—Spartan, unyielding, above taking notice of pain in themselves or others. Any one of the human cattle who allowed his emotions to become visible, would be "sick," in Aalaag terms. It would reflect on the character of an Aalaag master—even if he was Governor Of All Earth—if he permitted his household to contain unhealthy cattle.

Shane could end up on the blades himself, for all that Lyt Ahn had always seemed to like him, personally. He would have to get his feelings under control, and time for that was short. At best, he could steal perhaps half an hour more from his schedule in addition to what had already been spent watching the execution—and in those thirty minutes he must manage to pull himself together. He turned away, down a street behind him leading from the square, following the last of the dispersing crowd.

The street had been an avenue of small shops once, interspersed with an occasional larger store or business establishment. Physically, it had not changed. The sidewalks and the street pavement were free of cracks and litter. The windows of the stores were whole, even if the display areas behind the glass were mainly empty of goods. The Aalaag did not tolerate dirt or rubble. They had wiped out with equal efficiency and impartiality the tenement areas of large cities, and the ruins of the Parthenon and Athens; but the level of living permitted to most of their human cattle was bone-bare minimal, even for those who were able to work long hours.

A block and a half from the square, Shane found and turned in at a doorway under the now-dark shape of what had once been the lighted neon sign of a bar. He entered a large gloomy room hardly changed from the past, except that the back shelf behind the bar itself was bare of the multitude of liquor bottles which it had been designed to hold. Only small amounts of distilled liquors were allowed to be made, nowadays. People drank the local wine, or beer.

Just now the place was crowded, with men for the most part. All of them silent after the episode in the square; and all of them drinking draft ale with swift, heavy gulps from the tall, thick-walled glasses they held in their hands. Shane worked his way down to the service area in the far corner where the bartender stood, loading trays with filled glasses for the single waitress to take to the tables and booths beyond the bar.

"One," he said.

A moment later, a full glass was placed in front of him. He paid,

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and leaned with his elbows on the bar, his head in his hands, staring into the depths of the brown liquid.

The memory of the dead man on the blades, with his hair stirring in the wind, came back to Shane. Surely, he thought, there must be some portent in the butterfly also being called a Pilgrim? He tried to put the image of the insect between himself and the memory of the dead man, but here, away from the blue sky and sunlight, the small shape would not take form in his mind's eye. In desperation, Shane reached again for his private mental comforter—the fantasy of the man in a hooded robe who could defy all Aalaag and pay them back for what they had done. Almost he managed to evoke it. But the Avenger image would not hold in his head. It kept being pushed aside by the memory of the man on the blades . . .

"Undskylde!" said a voice in his ear. *"Herre . . . Herre!"*

For a fraction of a second he heard the words only as foreign noises. In the emotion of the moment, he had slipped into thinking in English. Then the sounds translated. He looked up, into the face of the bartender. Beyond, the bar was already half empty, once more. Few people nowadays could spare more than a few minutes from the constant work required to keep themselves from going hungry—or, worse yet, keep themselves from being forced out of their jobs and into becoming legally exterminable vagabonds.

"Excuse me," said the bartender again; and this time Shane's mind was back in Denmark with the language. "Sir. But you're not drinking."

It was true. Before Shane the glass was still full. Beyond it, the bartender's face was thin and curious, watching him with the amoral curiosity of a ferret.

"I . . ." Shane checked himself. Almost he had started explaining who he was—which would not be safe. Few ordinary humans loved those of their own kind who had become servants in some Aalaag household.

"Disturbed by what you saw in the square, sir? It's understandable," said the bartender. His green eyes narrowed. He leaned closer and whispered. "Perhaps something stronger than beer? How long since you've had some *schnapps?*"

The sense of danger snapped awake in Shane's mind. Aalborg had once been famous for its aquavit, but that was before the Aalaag came. The bartender must have spotted him as a stranger—someone possibly with money. Then suddenly he realized he did not care what the bartender had spotted, or where he had gotten a distilled liquor. It was what Shane needed right now—something explosive to counter the violence he had just witnessed.

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"It'll cost you ten," murmured the bartender.

Ten monetary units was a day's wage for a skilled carpenter—though only a small fraction of Shane's pay for the same hours. The Aalaag rewarded their household cattle well. Too well, in the minds of most other humans. That was one of the reasons Shane moved around the world on his master's errands wearing the cheap and unremarkable robe of a Pilgrim.

"Yes," he said. He reached into the pouch at the cord about his waist and brought forth his money clip. The bartender drew in his breath with a little hiss.

"Sir," he said, "you don't want to flash a roll, even a roll like that, in here nowadays."

"Thanks. I . . ." Shane lowered the money clip below bartop level as he peeled off a bill. "Have one with me."

"Why, yes, sir," said the bartender. His eyes glinted, like the metal of the Cymbrian bull in the sunlight. "Since you can afford it . . ."

His thin hand reached across and swallowed the bill Shane offered him. He ducked below the counter level and came up holding two of the tall glasses, each roughly one-fifth full with a colorless liquid. Holding glasses between his body and Shane's so that they were shielded from the view of others in the bar, he passed one to Shane.

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"Happier days," he said, tilted up his glass to empty it at a swallow. Shane imitated him; and the harsh oiliness of the liquor flamed in his throat, taking his breath away. As he had suspected, it was a raw, illegally distilled, high-proof liquid with nothing in common with the earlier aquavit but the name it shared. Even after he had downed it, it continued to cling to and sear the lining of his throat, like sooty fire.

Shane reached automatically for his untouched glass of beer to lave the internal burning. The bartender had already taken back their two liquor glasses and moved away down the bar to serve another customer. Shane swallowed gratefully.

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The thick-bodied ale was gentle as water after the rough-edged moonshine. A warmth began slowly to spread through his body. The hard corners of his mind rounded; and on the heels of that soothing, without effort this time, came his comforting, familiar daydream of the Avenger. The Avenger, he told himself, had been there unnoticed in the square during the executions, and by now he was lying in wait in a spot from which he could ambush the Aalaag father and son, and still escape before police could be called. A small black and golden rod, stolen from an Aalaag arsenal, was in his hand as he stood to one side of an open window, looking down a street up which two figures in green and silver armor were riding toward him . . .

"Another, sir?"

It was the bartender back again. Startled, Shane glanced at his ale glass and saw that it, too, was now empty. But another shot of that liquid dynamite? Or even another glass of the ale? He could risk neither. Just as in facing Lyt Ahn an hour or so from now he must be sure not to show any sign of emotion while reporting what he had been forced to witness in the square, so neither must he show the slightest sign of any drunkenness or dissipation. These, too, were weaknesses not permitted servants of the alien, as the alien did not permit them in himself.

"No," he said, "I've got to go."

"One drink did it for you?" the bartender inclined his head. "You're lucky, sir. Some of us don't forget that easily."

The touch of a sneer in the bitterness of the other's voice flicked at Shane's already overtight nerves. A sudden sour fury boiled up in him. What did this man know of what it was like to *live* with the Aalaag, to be treated always with that indifferent affection that was below contempt—the same sort of affection a human might give a clever pet animal—and all the while to witness scenes like those in the square, not once or twice a year but weekly, perhaps daily?

"Listen—" he snapped; and checked himself. Almost, once more, he had nearly given away what he was and what he did.

"Yes, sir?" said the bartender, after a moment of watching him. "I'm listening."

Shane thought he read suspicion in the other's voice. That reading might only be the echo of his own inner upset, but he could not take a chance.

"Listen," he said again, dropping his voice, "why do you think I wear this outfit?"

He indicated his Pilgrim robe.

"You took a vow." The bartender's voice was dry now, remote.

"No. You don't understand . . ." The unaccustomed warmth of the drink in him triggered an inspiration. The image of the butterfly slid into—and blended with—

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his image of the Avenger. "You think it was just a bad accident, out there in the square just now? Well, it wasn't. Not just accidental, I mean—I shouldn't say anything."

"Not an accident?" The bartender frowned; but when he spoke again, his voice, like Shane's was lowered to a more cautious note.

"Of course, the man ending on the blades—it wasn't planned to finish that way," muttered Shane, leaning toward him. "The Pilgrim—" Shane broke off. "You don't know about the Pilgrim?"

"The Pilgrim? What Pilgrim?" The bartender's face came close. Now they were both almost whispering.

"If you don't know I shouldn't say—"

"You've said quite a lot already—"

Shane reached out and touched his six-foot staff of polished oak, leaning against the bar beside him.

"This is one of the symbols of the Pilgrim," he said. "There're others. You'll see his mark one of these days and you'll know that attack on the Aalaag in the square didn't just happen by accident. That's all I can tell you."

It was a good note to leave on. Shane picked up the staff, turned quickly and went out. It was not until the door to the bar closed behind him that he relaxed. For a moment he stood breathing the cooler air of the street, letting his head clear. His hands, he saw, were trembling.

As his head cleared, sanity returned. A cold dampness began to make itself felt on his forehead in the outside air. What had gotten into him? Risking everything just to show off to some unknown bartender? Fairy tales like the one he had just hinted at could find their way back to Aalaag ears—specifically to the ears of Lyt Ahn. If the aliens suspected he knew something about a human resistance movement, they would want to know a great deal more from him; in which case death on the triple blades might turn out to be something he would long for, not dread.

And yet, there had been a great feeling during the few seconds he had shared his fantasy with the bartender, almost as if it were something real. Almost as great a feeling as the triumph he had felt on seeing the butterfly survive. For a couple of moments he had come alive, almost, as part of a world holding a Pilgrim-Avenger who could defy the Aalaag. A Pilgrim who left his mark at the scene of each Aalaag crime as a promise of retribution to come. *The* Pilgrim, who in the end would rouse the world to overthrow its tyrant, alien murderers.

He turned about and began to walk hurriedly toward the square again, and to the street beyond it that would take him to the airport where the Aalaag courier ship

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would pick him up. There was an empty feeling in his stomach at the prospect of facing Lyt Ahn, but at the same time his mind was seething. If only he had been born with a more athletic body and the insensitivity to danger that made a real resistance fighter. The Aalaag thought they had exterminated all cells of human resistance two years since. The Pilgrim *could* be real. His role was a role any man really knowledgeable about the aliens could play—if he had absolutely no fear, no imagination to make him dream nights of what the Aalaag would do to him when, as they eventually must, they caught and unmasked him. Unhappily, Shane was not such a man. Even now, he woke sweating from nightmares in which the Aalaag had caught him in some small sin, and he was about to be punished. Some men and women, Shane among them, had a horror of deliberately inflicted pain . . . He shuddered, grimly, fear and fury making an acid mix in his belly that shut out awareness of his surroundings.

Almost, this cauldron of inner feelings brewed an indifference to things around him that cost him his life. That and the fact that he had, on leaving the bar, instinctively pulled the hood of his robe up over his head to hide his features; particularly from anyone who might later identify him as having been in a place where a bartender had been told about someone called "the Pilgrim." He woke from his thoughts only at the faint rasp of dirt-stiff rags scuffing on cement pavement, behind him.

He checked and turned quickly. Not two meters behind, a man carrying a wooden knife and a wooden club studded with glass chips, his thin body wound thick with rags for armor, was creeping up on him.

Shane turned again, to run. But now, in the suddenly tomblike silence and emptiness of the street, two more such men, armed with clubs and stones, were coming out from between buildings on either side to block his way. He was caught between the one behind and the two ahead.

His mind was suddenly icy and brilliant. He had moved in one jump through a flash of fear into something beyond fright, into a feeling tight as a strung wire, like the reaction on nerves of a massive dose of stimulant. Automatically, the last two years of training took over. He flipped back his hood so that it could not block his peripheral vision, and grasped his staff with both hands a foot and a half apart in its middle, holding it up at the slant before him, and turning so as to try to keep them all in sight at once.

The three paused.

Clearly, they were feeling they had made a mistake. Seeing him with the hood over his head, and his head down, they must have

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taken him for a so-called praying pilgrim; one of those who bore staff and cloak as a token of non-violent acceptance of the sinful state of the world which had brought all people under the alien yoke. They hesitated.

"All right, Pilgrim," said a tall man with reddish hair, one of the two who had come out in front of him, "throw us your pouch and you can go."

For a second, irony was like a bright metallic taste in Shane's mouth. The pouch at the cord around a pilgrim's waist contained most of what worldly goods he might own; but the three surrounding him now were "vagabonds"—*Nonservs*—individuals who either could not or would not hold the job assigned them by the aliens. Under the Aalaag rule, such outcasts had nothing to lose. Faced by three like this, almost any pilgrim, praying or not, would have given up his pouch. But Shane could not. In his pouch, besides his own possessions, were official papers of the Aalaag government that he was carrying to Lyt Ahn; and Lyt Ahn, warrior from birth and by tradition, would neither understand nor show mercy to a servant who failed to defend property he carried. Better the clubs and stones Shane faced now than the disappointment of Lyt Ahn.

"Come and get it," he said.

His voice sounded strange in his own ears. The staff he held seemed light as a bamboo pole in his grasp. Now the vagabonds were moving in on him. It was necessary to break out of the ring they were forming around him and get his back to something so that he could face them all at the same time . . . There was a storefront to his left just beyond the short, gray-haired vagabond moving in on him from that direction.

Shane feinted at the tall, reddish-haired man to his right, then leaped left. The short-bodied vagabond struck at him with a club as Shane came close, but the staff in Shane's hand brushed it aside and the staff's lower end slammed home, low down on the body of the vagabond. He went down without a sound and lay huddled up. Shane hurdled him, reached the storefront and turned about to face the other two.

As he turned, he saw something in the air, and ducked automatically. A rock rang against the masonry at the edge of the glass store window, and glanced off. Shane took a step sideways to put the glass behind him on both sides.

The remaining two were by the curb, now, facing him, still spread out enough so that they blocked his escape. The reddish-haired man was scowling a little, tossing another rock in his hand. But the expanse of breakable glass behind Shane deterred him. A dead or battered human was nothing; but bro-

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ken store windows meant an immediate automatic alarm to the Aalaag police; and the Aalaag were not merciful in their elimination of Nonservs.

"Last chance," said the reddish-haired man. "Give us the pouch—"

As he spoke, he and his companion launched a simultaneous rush at Shane. Shane leaped to his left to take the man on that side first, and get out away from the window far enough to swing his stave freely. He brought its top end down in an overhand blow that parried the club-blow of the vagabond and struck the man himself to the ground, where he sat, clutching at an arm smashed between elbow and shoulder.

Shane pivoted to face the reddish-haired man, who was now on

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tiptoes, stretched up with his own heavy club swung back in both hands over his head for a crushing down-blow.

Reflexively, Shane whirled up the bottom end of his staff; and the tough, fire-hardened tip, traveling at eye-blurring speed, smashed into the angle where the other man's lower jaw and neck met.

The vagabond tumbled; and lay still in the street, his head unnaturally sideways on his neck.

Shane whirled around, panting, staff ready. But the man whose arm he had smashed was already running off down the street in the direction from which Shane had just come. The other two were still down and showed no intention of getting up.

The street was still.

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Shane stood, snorting in great gasps of air, leaning on his staff. It was incredible. He had faced three armed men—armed at least in the same sense that he, himself was armed—and he had defeated them all. He looked at the fallen bodies and could hardly believe it. All his practice with the quarterstaff . . . it had been for defense; and he had hoped never to have to use it against even one opponent. Now, here had been three . . . and he had won.

He felt strangely warm, large and sure. Perhaps, it came to him suddenly, this was the way the Aalaag felt. If so, there could be worse feelings. It was something lung-filling and spine-straightening to know yourself a fighter and a conqueror. Perhaps it was just this feeling he had needed to have, to understand the Aalaag—he had needed to conquer, powerfully, against great odds as they did . . .

He felt close to rejecting all the bitterness and hate that had been building in him the past two years. Perhaps *might* actually could make *right.* He went forward to examine the men he had downed.

They were both dead. Shane stood looking down at them. They had appeared thin enough, bundled in their rags, but it was not until he stood directly over them that he saw how bony and narrow they actually were. They were like claw-handed skeletons.

He stood, gazing down at the last one he had killed; and slowly the fresh warmth and pride within him began to leak out. He saw the stubbled sunken cheeks, the stringy neck, and the sharp angle of the jawbone jutting through the skin of the dead face against the concrete. These features jumped at his mind. The man must have been starving—literally starving. He looked at the other dead man and thought of the one who had run away. All of them must have been starving, for some days now.

With a rush, his sense of victory went out of him; and the sickening bile of bitterness rose once more in his throat. Here, he had been dreaming of himself as a warrior. A great hero—the slayer of two armed enemies. Only the weapons carried by those enemies had been sticks and stones, and the enemies themselves were half-dead men with barely the strength to use what they carried. Not Aalaag, not the powerfully-armed world conquerors challenged by his imaginary Pilgrim, but humans like himself reduced to near-animals by those who thought of these and Shane, in common, as "cattle."

The sickness flooded all through Shane. Something like a ticking time bomb in him exploded. He turned and ran for the square.

When he got there, it was still deserted. Breathing deeply, he slowed to a walk and went across it, toward the now still body on the

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triple blades, and the other body at the foot of the wall. The fury was gone out of him now, and also the sickness. He felt empty, empty of everything—even of fear. It was a strange sensation to have fear missing—to have it all over with; all the sweats and nightmares of two years, all the trembling on the brink of the precipice of action.

He could not say exactly, even now, how he had finally come to step off that precipice at last. But it did not matter. Just as he knew that the fear was not gone for good. It would return. But that did not matter, either. Nothing mattered, even the end he must almost certainly come to, now. The only thing that was important was that he had finally begun to act, to do something about a world he could no longer endure as it was.

Quite calmly he walked up to the wall below the blades holding the dead man. He glanced around to see if he was observed; but there was no sign of anyone either in the square or watching from the windows that overlooked it.

He reached into his pocket for the one piece of metal he was allowed to carry. It was the key to his personal living quarters in Lyt Ahn's residence, at Denver—"warded" as all such keys had to be, so that they would not set off an alarm by disturbing the field which the Aalaag had set up over every city and hamlet, to warn of unauthorized metal in the possessions of humans. With the tip of the key, Shane scratched a rough figure on the wall below the body: the Pilgrim and his staff.

The hard tip of the metal key bit easily through the weathered surface of the brick to the original light red color underneath. Shane turned away, putting the key back into his pouch. The shadows of late afternoon had already begun to fall from the buildings to hide what he had done. And the bodies would not be removed until sunrise—this by Aalaag law. By the time the figure scratched on the brick was first seen by one of the aliens he would be back among the "cattle" of Lyt Ahn's household, indistinguishable among them.

Indistinguishable, but different, from now on—in a way the Aalaag had yet to discover. He turned and walked swiftly away down the street that would bring him to the alien courier ship that was waiting for him. The colorful flicker of a butterfly's wings—or perhaps it was just the glint of a reflection off some high window that seemed momentarily to wink with color—caught the edge of his vision. Perhaps, the thought came suddenly and warmly, it actually was the butterfly he had seen emerge from its cocoon in the square. It was good to feel that it might be the same, small, free creature.

"Enter a Pilgrim," he whispered to it triumphantly. "Fly, little brother. Fly!" ■

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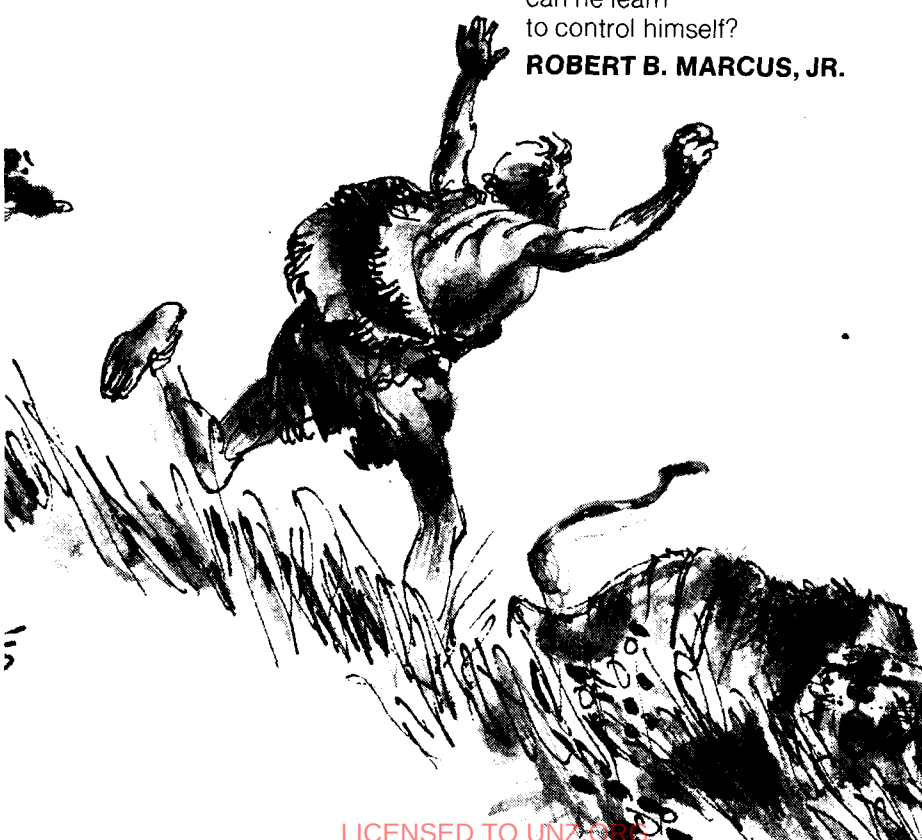
The Ninth Circle

In a world
where man can control
energy and time,
can he learn
to control himself?

ROBERT B. MARCUS, JR.



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Time, the eternal enemy, was sharpening its sword—he could hear the grating of the file as it moved down the blade. Soon a veiled arm would swing and the end would come. He would have failed.

Roland Thompson shivered and clutched his fur cape a little tighter. But the perpetual cold groped around this cloth obstacle and stroked him with its deadly, icy fingers. He would have exchanged without hesitation all his Twenty First Century possessions for one good arctic parka now.

Eight days were left. He had already squandered half of his allotted time. It was difficult to believe, as he sat here in these mountains, that the fate of a country three thousand miles and fourteen thousand years away might depend upon his success . . . or failure.

Thompson stared westward, where the sun was still clinging to the horizon, then turned his gaze to the south and shivered again. Gray peaks scratched the sky as far as his vision would take him. His imagination descried the glaciers that he knew were distantly there, somewhere to the south of him, but his eyes couldn't see them. He estimated his latitude to be between ten and fifteen degrees south, and he wondered if those frozen mountains had ever come this close to the equator. He wanted to ask someone, but his companions wouldn't understand a word he said. Thompson was fluent in English, French, Chinese and Russian, and comprehended half a dozen other languages, but none would serve him here, for no one else in the world spoke any of them. Except Wisnovsky. And he didn't remember.

But Thompson realized that he could worry about the glaciers later. There were more immediate matters to attend to now. He had ten numb toes to save.

Before Thompson completed the painful task of staggering to his feet, a man appeared in front of him, spear in hand, and indicated that in his opinion Thompson should remain seated. Roland answered with an outstretched right hand, but instead of receiving a handshake, he almost got a spearpoint through his palm. He sighed. To a Twenty First Century American the act of shaking hands would be almost instinctive; unfortunately, a man whose conscious mind and memories functioned as if they were native to the Twelfth Millennium BC would have a fear of strangers which would overwhelm any lingering instinct for handshaking. Thompson really hadn't expected the ploy to succeed.

"OK, Judas, I won't make any sudden moves again. I just want to sit a little nearer to the fire." As he spoke, Thompson clutched his cape around him, exaggerated his shivering, then pointed to the fire around

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which the rest of the small band was sitting. The man looked puzzled and scared so Thompson repeated his gesture. Still Judas did not understand.

"Well, Judas," Thompson said, "I have two choices. Either I sit out here and freeze to death, or I walk closer to the fire and hope you don't give me that spear in my gut. I think I'll take my chances with the latter." He abruptly strode toward the fire. The native stumbled backward in a hasty retreat until Thompson was within ten yards of the fire. Then Judas made his stand. The quivering glow in the man's eyes told Roland that perhaps this wouldn't be such a bad place to sit down. He did so. If the band let him stay here all night he probably wouldn't freeze, though he wouldn't be any too comfortable, especially since this night was without a doubt going to be the coldest yet. Not a reassuring thought, because a polar bear would have had trouble adjusting to the weather so far.

The fire burned in the hearthway of the band's large mountain cave, and only the seven men in the band sat on the outside of the fire where Thompson could see them clearly. The women and children were shadow creatures on the far side of the fire, buried by the darkness within the cave that even the light from the fire could not penetrate.

The band consisted of seven men, six women, and three children, and even the adults were young, probably not more than nineteen or twenty, though they appeared much older in many ways. This climate and the hardness of their way of life ingrained the years upon their bodies. The leader, however, was older, perhaps thirty-five or even forty—it was impossible to determine his exact age, since in other circumstances, other times, he could have passed for sixty. Possibly he was the father of some or all of the others. He was an old man by their standards; few, if any, of the younger ones would count as many winters as he had lived.

Six of the men had women, with a strictly monogamous relationship as far as Thompson could tell, but then he couldn't see what went on inside the cave at night. Two of the children belonged to one of the women, the mate of the man whom Thompson called Judas. Roland had names for three of the other men, too, primarily for the purpose of organizing his thoughts.

Thompson looked over the men once more. Which one was Wisnovsky?

One of the men was about five feet, ten inches tall, weighing perhaps a hundred and fifty pounds. He was too big. A second man was six inches shorter and could have barely pushed the needle of a scale over the hundred mark. He was too

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little. Since the chief was missing three fingers on his right hand, no doubt the result of some almost forgotten hunt, he too could be eliminated. Thompson did not believe the Eurasians would go quite that far to disguise Wisnovsky.

That left four men. All were about Wisnovsky's height, five feet, five inches tall, and all appeared to be about Wisnovsky's weight, a hundred and forty pounds. All had dark brown skin over wiry frames, dark brown eyes, large mouths and nostrils, and short foreheads which sloped back more rapidly than a Twenty First Century man's. And any one of them could be Wisnovsky: Judas, Thompson's present guard and the father of two of the children: Ugolino, the spearpoint-maker: Brutus, the father of the third and oldest child, a boy about seven; and Cassius, the wifeless one.

The names were the names of traitors because Wisnovsky was a traitor. At least General Foster thought so. Thompson wasn't so sure, but he had accepted the general's opinion temporarily.

Four men. They all looked alike, yet one was different. Thompson frowned. What mark does civilization leave on a man's mind? Three of his four suspects were primitive cave dwellers, the fourth was born in the Twenty First Century AD. But the latter was living among and acting like the former—indeed, he believed he was one of them—how could he be distinguished? For eight days the problem had tormented Thompson's brain, and still the answer was as far away as the time from which he had come.

Thompson never did get to sleep that night.

The band retired into the cave, leaving only one man, Cassius, behind to watch Thompson and the darkness. Roland studied him as Cassius tended the fire and stared into the gloom. He wondered why the guard was necessary, since he couldn't think of any animals which would threaten the band. Obviously, however, there *were* dangers.

Or . . . and the thought bothered Thompson . . . was he the danger they were worried about? He had tried to prove to them that his intentions were peaceful and harmless, but perhaps the information had not crossed the fourteen-thousand-year culture gap. There was certainly no rush of people to befriend him. For the most part, everyone attempted to ignore him and pretend he didn't exist. As he put together the facts, he realized that they must think he was either an apparition, or an evil shaman.

After observing Cassius for a few minutes, it became evident that the man was afraid of him, and that this fear was wrestling with his sense of duty. At length Cassius retreated into the cave with the rest

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of the band, fear having been the victor in the struggle.

Now Thompson was alone. His body ached, and his muscles desperately needed rest, but his mind would not cooperate. His eyes drifted out of focus—the fire danced and blurred—his eyelids drooped, blinked . . . sagged. Light left his world.

And still his mind refused to surrender. There was too little time and too much to think about.

One little test—that's all he needed. Just a simple test to separate one Twenty First Century man from his primitive companions.

Two different cultures, two different times. And all he needed was one basic difference. Just one.

Though his mind was alert, his tired body almost betrayed him. Only a misstep by his assailant saved his life.

A pebble clattered across the cave floor. He forced his eyelids open. His eyes did not adjust instantly but he saw the shadow in the hearthway, the arm held high.

He rolled to his right, and the arm jerked; the spear smashed into the ground near his feet.

Now he was fully awake and standing. But the figure was gone.

He stood for a long time staring into the cave, breathing hard. It didn't make sense. The band was afraid of him. If they viewed him as an evil shaman, as he suspected they did, they would not dare try to kill him. They would be afraid his evil spirit might linger to torment them.

There was another thing. Without a doubt, the spear toss had been very inaccurate. The attacker had stood not more than forty feet from Thompson, yet the spear had landed at his feet, not in the dirt where his chest had been. That didn't make sense. These people lived by the spear—died by their failures. It was inconceivable that one of them could miss his target at a distance as close as forty feet.

Of course, even virtuosos made mistakes. The native had not expected Thompson to roll when he did. The throw had been hurried. Maybe that accounted for the error.

Thompson breathed a sigh of relief and accumulated tensions dissolved. One thing was certain: another few seconds and another few steps and the assailant would never have missed, no matter how poor a spearthrower he was.

The thought disturbed Thompson. There should be no poor spearthrowers in the band. All the men, even Wisnovsky, because of his psychotransformation, should be excellent shots.

All Thompson's feelings of fatigue had vanished by now, and the remainder of the night brought no rest, no sleep, no escape from the questions which haunted him.

The band considered him a shaman because he had appeared out of the air before their astonished

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eyes. But an hour before that, his time, there had been a corridor a mile beneath the Arizona desert where he walked as just a man, with no pretensions of being anything other than a man.

"Why not send someone who knows Wisnovsky?" Thompson asked.

General Abrams Foster shrugged and twitched his nose. "Naturally, that was our desire. Unfortunately, this someone had to meet several other qualifications. He had to be intelligent, he had to be a top agent, and most important of all, he had to be available within an hour. I am not completely sure whether it was a stroke of good fortune or a cruel joke of fate that you were here."

"If you have doubts about me, I will—"

"Most of my agents are a blood-lusting lot," the general continued, ignoring Thompson. "Not you. You would walk fifty miles out of your way to avoid fighting with some obnoxious little creep that you could destroy without losing a drop of sweat. On this mission, I would have preferred to send someone who would not hesitate to kill every suspect if Wisnovsky could not be identified."

"You would *kill* Wisnovsky?"

"Yes. The Eurasians must not have him."

"You know I wouldn't do that," Thompson said. He stared over at the general.

The general sighed deeply. "That is not your only fault. When you arrive, you will no doubt scare what few wits these people have completely out of them. Why couldn't you be smaller?"

Thompson drew himself up to his full six and a half feet. "Some faults I can change; my height I cannot."

"If you lost a hundred pounds, you would still outweigh most of them."

Thompson grinned. "It's all muscle."

"They will probably mistake you for a mountain," General Foster commented. He sighed again. "I suppose you'll have to do, however."

"Why were you limited to an hour to locate your agent?"

"It is a matter of power. We have a lock on Wisnovsky's position, but it is a tenuous one. To hold it requires draining power from the base's warp-screens. Even at full strength, the screens can barely repel a cobalt blast; to weaken them very much would be suicide. The base might survive, but most of the remainder of the US—which depends on us for defense—would not."

"Can't we find Wisnovsky again if we lose him?"

"No. We know only that he is somewhere in the Andes twelve thousand to fourteen thousand years ago. That is as much accuracy as our equipment will give us.

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It is like being on a ship at sea looking through a pair of cheap field-glasses at a beacon on the shore. As long as it is burning, you can easily follow that beacon in to land, but from a hundred miles out there is no way to precisely determine the coordinates of the beacon with your crude instrument. If the beacon goes out, you probably would never be able to land at that exact point on the shore.

"Similarly, to find Wisnovsky again we need his exact position in time and space. We have neither."

The morning brought warmth of a kind. By midmorning the temperature had risen to almost fifty by Thompson's estimate. The natives hardly seemed to notice. They looked as content at twenty as at fifty, though they wore virtually no clothing, merely skins wrapped around their waists. Thompson understood how the Eurasians could change Wisnovsky's face and mind, teach him the native language and customs, and prepare him with the necessary skills to survive, but it was difficult to comprehend how the physicist had adapted to the cold so quickly.

A noise behind him made Thompson turn toward the cave where the band lived. The fire still burned in the hearthway, slightly smaller now that daylight had come. It was never allowed to go out. No doubt it was far easier to keep it burning than to start it again. Matches would be scarce for a few thousand years.

Again the shuffling of feet sounded in the entrance of the cave, and this time one of the women stepped out of the darkness into the sunlight carrying a piece of meat and a crude clay bowl full of water. She walked over and placed them in front of Thompson, then sat down.

"Thank you," Thompson said. She cocked her head to one side and stared at him. Except for her exceptionally broad face, she was almost attractive. Certainly she was nature's only attempt at pulchritude in this band. But that was only his opinion. The men in the band no doubt had a differing conception of

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beauty, since they showed her no particular favor. She was Ugolino's woman and no other man paid any attention to her. She appeared to be younger than the rest of the women, having fewer wrinkles and a smoother skin.

"*Qunoiy*?" she suddenly asked, pointing to his fur cape.

"You like it? It's from a very exclusive shop in Manhattan." Thompson smiled and took another bite of meat. It was cold, greasy and cooked somewhere between rare and raw, but he was hungry enough to eat anything. It could have been anything, too, though it was probably part of that giant sloth the men had dragged home yesterday. At least it was far better than the berries they fed him at first. He didn't eat any of them for two days because he was afraid they were poisonous. Even if the sloth did taste like greasy, unsolidified plaster of paris, he could be sure it wasn't a threat to his life.

"*Qunoiy*?" she repeated, moving close to him, then reaching out to stroke the fur. General Foster had lacked the time to prepare clothing more suitable to this period, and Thompson's fur was much softer and prettier than anything the band had. The general had sacrificed a great deal in hopes of accomplishing this mission—his time, his energy, his sleep—and three-quarters of a beautiful bearskin rug.

The moment the woman touched the fur, Judas, who was still watching Thompson, galloped over and yanked her away. A verbal battle immediately followed, and it was apparent that the man was hopelessly outclassed. Finally, in disgust and desperation, he slapped her and dragged her over to her husband, Ugolino, who frowned and then led her into the cave. Thompson could not see what happened inside, but he heard several loud female voices, then Ugolino reappeared with his head erect and a smug look on his face. He returned to his seat by the fire.

Over a week had passed and still Roland was no closer to identifying Wisnovsky. None of his four suspects bore the slightest resemblance to the picture Thompson carried in his mind—except in weight and height, where all fit the description. The Eurasians had been thorough. The plastic surgeons had done a superb job, erasing every possible distinctive feature, even managing to slope Wisnovsky's forehead back more sharply than was normal for his race, in order to match his silhouette to that of his primitive companions. Then the psychotransformation had shoved every memory of Twenty First Century civilization below the reaches of his consciousness, to be buried there until needed. Or—was this true?

Until last night he had assumed Wisnovsky was oblivious to his other existence. But now, doubts floated everywhere. Was it possible

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that Wisnovsky was aware of his identity and location? If not, who was the attacker last night?

Thompson studied his four suspects again. Cassius was the obvious choice of the four. He had no mate, and was the loner of the band. Any imperfections of the psychotransformation would be noticed less readily in him. Ugolino was the spearpoint-maker, and seemed very adjusted to life in the band, which was a mark against him. However, because he was the spearpoint-maker, he encountered the least danger of the four, since he went on the fewest hunts. That would be an advantage. Judas was the most belligerent of the four, but it was a belligerence born out of fear, so it might have no significance. On the other hand a psychotransformation couldn't erase *all* traces of a man's previous personality; therefore, since Wisnovsky was known to be a very docile man, perhaps Judas' hostility was an important negative clue. Brutus was the last suspect, and the one Thompson knew the least about. He spent most of his time with his son, teaching him the band's way of life. Could mind-shaping build such a strong bond?

Thompson knew that he had made no progress by simply observing the four men. Maybe if he had a year or two he could sort out Wisnovsky using this method, but time was running out and something else had to be tried. He had to find some way of breaking through the barrier imposed by the psychotransformation. Again and again the question crept into his thoughts: what memory of civilization is most imbedded in a man's mind?

He had drawn pictures in the sand: airplanes, the Solar System, a mushroom cloud, a triangle, anything that he thought might trigger a response in Wisnovsky's brain, even one of Wisnovsky's own equations. The sole result was that he was now watched even more closely.

The temperature was still rising but it would never reach the point where he could say that he was warm. He was somehow reminded of an old book he'd once read, where traitors were punished in a frozen hell for all eternity. If Wisnovsky was indeed a traitor, it was only fitting that the Eurasians should choose to send him here, to this quasi-eternal winter a mile in the sky.

Wisnovsky had come because he'd had no choice, but whatever had possessed the ancestors of these natives to leave the warm northlands?

Then Thompson remembered. Less than three thousand years ago, there had been no glaciers, no winter. Perhaps man had come then. Or perhaps he had come even earlier, during another interstadial period.

Whenever he had come, he was

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here to stay. A great civilization would rise in these mountains. Great pyramids and temples would be built, and though this civilization would be conquered by Pizarro and his small force of two hundred Spaniards, it was in many ways superior to Europe of the same age: there would be no unemployed, no debtors' prisons, little crime, no destitute aged . . .

The day was still quiet and Thompson found himself staring up at the sun, a round yellow splash in a sullen blue sea. Wisnovsky had become one of these men, body *and* mind; their thoughts were his thoughts, their beliefs were his beliefs. It was a tragic descent for one of the most brilliant intellects in the history of the human race.

As he stared upward, an idea bobbed somewhere in his brain, but he couldn't quite catch it.

"Aren't there other physicists who can work with Wisnovsky's equations?" Thompson interrupted.

General Foster almost smiled. "Do you think that we haven't made that attempt? A hundred of the best minds in the Western world are struggling with the problem, but without success. Only Wisnovsky's associate, Dr. Eddis, has been able to accomplish anything at all. But he is no Wisnovsky. No one is. Wisnovsky's mind is unique. Someone once said that mathematics is a means by which we mortals translate reality, which we cannot hope to understand, into symbols which we can. Wisnovsky is far beyond us. He comprehends the reality. He merely transcribed the mathematical equations for idiots such as ourselves and the remainder of the human race."

"He *is* a genius," Thompson remarked.

"Wisnovsky," General Foster answered, "would be a genius in a race of Einsteins."

Thompson raised his eyebrows, then glanced down at the dossier.

Raymond Leonard Wisnovsky, b. June 27, 2013, Albany, New York. BS, Physics, with High Honors, Fineman Institute of Physics, New York, 2027; PhD, California Institute of Technology, 2029. Dissertation: "Theoretical Considerations of the Energy Sources of Quasi-Stellar Objects." Published in Astrophysical Review, *June, 2030. Other publications:* American Journal of Physics, *March, 2041: "A Derivation of the Temporal Equations from Non-Einsteinium Relativity";* Am. J. Physics, *Dec. 2041; "Possible Applications of the Temporal Equations." Awarded Nobel Prize in Physics, 2043. Employment: Cal. Tech., 2029 to 2042; US Govern., 2042 to 2045 (Ponce de Leon Project). Captured by Eurasians, Nov. 19, 2045. Marital Status: single. Personality profile: reserved, docile person, easily influenced and naive in some areas, but has strong opinions about those things he believes in. Dedicated pacifist.*

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"Wisnovsky has only published three papers?" Thompson asked.

"You would not call them ordinary papers, would you?"

"But between '29 and '43—what did he do?"

"Teach, for one thing. And dabble in his research," the general added, dryly. "Even Wisnovsky is mortal. It took him fourteen years to do what no one else could have done in the next century."

Thompson did not reply at first. Then he said: "Why is the time project so important?"

"Because if Wisnovsky is right, whoever first controls time will win the war."

"Did he say that?"

"His equations did."

"I'm afraid I don't follow you."

"His equations show that history can be changed, that it is not an immutable continuum. One man from 2046 loose in 2025 could end this war before it started. Neither side has developed the capability of hitting a target so close to the present, but the side that accomplishes that feat first—" Foster turned toward Thompson, his eyes narrowed and fixed, his breathing short and irregular. "You *must* find Wisnovsky. The East and West have been fighting for over twenty years now. The war, as you are aware, is a stalemate. We can tolerate a stalemate, but we cannot afford to lose. The Eurasians will destroy our culture. There will be no mercy, no—" Foster abruptly stopped as they came to a large steel door. He pressed his right hand in the middle and the door opened, sliding away into the wall.

"Welcome to the portals of time," he said.

All the men except Ugolino and Brutus left the next morning at sunrise on a hunting trip. Thompson had trouble deciding whether to stay or go with them, but ultimately settled on the former course. There would be other hunting trips, and today he wanted to observe Ugolino and Brutus, especially Brutus.

Brutus spent most of the day showing his son how to throw a spear, which was interesting, but proved only one thing: Brutus was too good a marksman to have missed if he had been the attacker two nights ago.

Thompson spent most of his time watching Ugolino, whose quick hands turned out spearpoints at a prodigious rate. Every man in the band was of course capable of producing a spearpoint, but Ugolino was the master craftsman. His points were thinner and sharper, and very seldom did Roland see a point made by someone else at the tip of a spear.

When he finished a point, Ugolino would select a long branch from a pile that a couple of the women had gathered from the valley below. Though he picked up many, few branches met his ap-

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proval, and after about two hours he had to send the women back down to find some more. When he discovered one he liked, he would lash the point to the branch with strips of hide and then give the product to Brutus to test-throw. His concentration wandered at times, and with every scream from the valley he would glance away from his work in the direction that the hunting party had gone. Thompson received the distinct impression that Ugolino would rather have gone with them, but there was a job to do and he was the person most qualified to do it.

The rest of the men returned from their hunting expedition about an hour before sunset, carrying a small deerlike creature, which was taken inside, bloodily skinned and hung over the fire for supper.

For Thompson, however, supper had much in common with breakfast: water in a dried clay bowl and another piece of the sloth from the day before. The sole difference was that the water was much clearer than it had been at breakfast.

The same girl brought Thompson his food. He wondered why the band even bothered to feed him. Finally he decided that it must be due to their opinion of him. They fed him to appease him, to protect themselves from his wrath in case he did have some evil magical powers. And yet, they weren't completely convinced he had them, because they did not feed him the best food available, they gave him only leftovers.

The girl seated herself in front of him and watched him eat, but this time made no attempt to touch his fur. Judas, or perhaps someone more persuasive, had taught her a lesson she had not forgotten.

When he finished, Roland took a stone and drew on the ground a picture of a sloth surrounded by a circle of men with spears. The girl frowned at first, evidently puzzled, then she began to laugh. A sharp word from the chief silenced her but still she grinned, revealing several gaps where teeth had once been.

Noting his success, Thompson drew another animal, intending to produce a deer but ending up with what looked more like a long-legged pig. Again he added the circle of men with spears. He pointed to himself and drew another man considerably larger than the rest, but without a spear.

Once more she broke into laughter. This time Ugolino jumped up and strode over, and with a kick of his foot, eliminated the drawings, then jerked the girl away and pulled her over to where the women were seated. There he dropped her. The chief nodded his approval at the way Ugolino had handled his mate.

Thompson's eyes followed Ugolino back to the group of men. There was tension in the air. He

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had sensed it the moment the men returned from their hunt. And whatever they planned and were still planning pertained to him, for occasionally one of them, usually the chief, would gesture in his direction.

Perhaps he should leave the cave tonight. Thompson knew he could hide somewhere on the mountainside until his time was up, then return to the Twenty First Century and tell General Foster that he had not been able to find Wisnovsky. No one would be able to disprove it.

But Thompson quickly dismissed the idea, and admonished himself for even considering it. He had come here for a purpose, and even though he wasn't sure he believed in that purpose, he wasn't going until he accomplished it, unless his time expired first. After all, the ceramic lump implanted under his arm provided an immediate escape should he stumble into any danger. The only thing he really had to worry about was being killed in his sleep. There had been one attempt; there might well be another. He would just have to sleep more lightly, or farther from the cave.

With that thought in mind, he moved out to where the fire was only a bright splotch in the distance. But it was cold out here, not as cold as it had been two nights ago, but cold enough to prevent him from getting comfortable. Not until long after the men had retired for the night did he begin to dream. It was not just the cold which kept him awake, however, and neither was it the fear of death. Rather it was the fear that he would not be able to identify Wisnovsky.

He needed something to unlock the memories in Wisnovsky's mind. But so far, he had thought of nothing.

As he finally fell asleep the moon rose, rolling over the mountains to the east, a round yellow skull in the open grave of the sky, leering down at him with a toothless, frozen grin. Suddenly the moon was gone, replaced by another object in his mind's eye, but little consciousness remained, and by the time he recognized it and awoke, there was only the moon once more.

Thompson walked through the doorway with General Foster feeling somewhat uneasy, for he knew that he would not be leaving via the same exit.

Inside, the entire left wall was a maze of instruments and controls, while in the center of the room four men were giving their attention to a wire loop about three feet in diameter suspended from a cubical steel frame. Several wires ran from the loop across the floor to the control panel, but otherwise the room was empty, though Thompson could see another door in the right wall leading to a room full of

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what looked like transformers and power supplies. There wasn't a single "Keep Out" sign anywhere in sight. Obviously, anyone who made it this far was considered to be authorized.

"There's one thing you haven't explained," Thompson said. "How did you get a fix on Wisnovsky in the first place?"

"One of our agents managed to infiltrate the Eurasian project and was able to trace Wisnovsky. He tried to follow the physicist through the loop."

"And he died?"

"Yes. The machine was not set for him and most of him was not reassembled at the other end. But what did get through was enough to enable us to get a fix."

"Did he know what was going to happen to him?"

"No."

"And you didn't warn him?"

"There wasn't enough time. Besides, we didn't know either."

Thompson glared at the general, but Foster avoided his gaze.

"Do you know how it works?" Foster asked at length.

"Only vaguely."

"When you step through the field-loop, your atoms are disassembled and then reassembled in the past. However, this transfer from the present to the past requires us to increase the temporal energy of your atoms. You see, Wisnovsky's equations show that temporal energy is inversely related to entropy. As time proceeds, and the universe runs down, entropy increases and temporal energy decreases. Thus, atoms from the present have less inherent temporal energy than atoms in the past. Even though we increase this energy to force them backward in time, the atoms gradually lose this energy and slip back across the temporal junction to our period. As each one does that, the body replaces it with one from the other period, so that after about six months every atom in the transported body is native to the time period it was transported to."

"And then there is no way to bring the person back?"

"No. All we have to do at first is simply cut the power and the atoms from this period automatically snap back to here. But we have yet to develop the technology to transport a body made of atoms native to another time-period to the present. We can push an object through time but we cannot pull. And that brings up another point. When you bring back Wisnovsky, make sure you are holding on to him when you push the return button. That way your field will envelop him and he should snap back here with you."

"How long do I have to bring Wisnovsky back?"

"About fifteen days. After that there would be too much replacement by atoms from the native period, and the abrupt loss of these

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atoms when the time-traveler returned would cause death." He paused. "Remember, you are kept in the past by maintaining a constant temporal energy balance on you. Therefore, when fifteen days have passed for you, fifteen days will also have passed here. We will bring you back at that time. If Wisnovsky is not with you, mankind will have lost its first supergenius."

The sun was directly overhead, but had little success in its attempts to dispel the chill of the mountains. Thompson surveyed his companions and wondered why they had brought him along on their trip.

Eight men, seven spears. Thompson felt naked without a weapon. Once while no one was watching, he stooped over and picked up a rock the size of an orange and hid it under his cape. Now he wished he had dug up the blaster. It lay buried near the cave, along with everything else he had brought back in time with him.

The band's cave was nestled in the side of a mountain about three thousand feet above the floor of the valley and five hundred feet below the top of the peak. Thorny shrubs dotted the mountain around the cave, but by now the men had descended into the forest of the valley. The chief led the way and seemed to be following something, or at least the tracks of something. Thompson kept looking down but could see nothing.

They were deep within the forest now and only splatterings of sunlight broke through the canopy of leaves high above. Little grew here beneath the trees and the way was easy. And quiet. It was completely silent except for the rattle of their footsteps. Nothing else moved. Nothing uttered a sound.

Thompson was unnerved by the silence. He had not expected it. Neither could he believe it was normal. Something was hunting besides these natives.

A scream not more than a mile away shattered the quiet, and the pieces of silence fell around him like broken glass. The chief nodded to the others and the men began to move softly in the direction of the scream. The scream was not repeated, but soon afterward Thompson heard the first roar. His ears told him instantly it was a cat. And his mind told him what kind of cat it had to be.

No one had ever been able to say for certain whether or not the saber-toothed tiger existed in this time period, in this place, but several anthropologists had found bones in the Andes which they claimed were the remnants of it. Now there was no doubt; Thompson knew for certain.

For an hour they followed the roars ahead of them, slowly closing the distance. A second weak scream was heard as they moved closer. They were downwind of the cat and it did not become aware of

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them until they were almost upon it. Even after it noticed them, it must have decided it had nothing to fear, for it continued to eat the small animal it had just killed. Intermittently it raised its head and let out another indifferent roar.

Thompson stopped in awe. The evil face finished its meal and stared over at him, its two large fangs curling down over its lower lip. Thompson couldn't believe that this was the natives' quarry. They were too timid. Except for one of them—the one that had tried to kill him.

A spear in the back prodded him and he stumbled forward. Suddenly he realized their plan but it was already too late. Behind him was a semicircle of spears pointing at his back. Blocking off his escape ahead was the saber-toothed tiger.

He was irritated that he had allowed himself to be trapped in this way. He had definitely underestimated their intelligence. Or had he? Somehow the plan seemed too intricate for their minds. But it wouldn't be too intricate for a mind like Wisnovsky's.

Thompson tossed the idea aside for the moment and considered the present situation, remembering the ceramic button beneath his arm, but knowing he could only use it as a last resort. He had been sent here to bring back Wisnovsky, and that was what he was going to do.

Step by step the men advanced, driving Thompson toward the waiting cat. Its eyes burned into his. There was no sign of fear.

The cat was stationed on the slope of a small grass-covered knoll. There were only two or three small trees nearby. This was near the outskirts of the valley and the forest had thinned out. If he could somehow get by the cat and over the knoll, he might have a chance. One thing was for sure—if he got by the cat, none of the men would attempt to follow him.

He had no chance against the spears, he had to face the cat. One spear could be fatal. He might get mauled by the cat but he thought he could survive long enough to press the recall button under his arm if necessity demanded such action. The cat wouldn't go back with him because its atoms were native to this time-period. It could have made an interesting situation, though. Thompson could imagine the expression on General Foster's face if this little feline monster arrived in the laboratory.

The thought made him want to laugh. So he did. This seemed to bewilder both the tiger and the men so Thompson continued. If a tiger could look puzzled, this one did.

Thompson took another step forward, then stopped. Maybe what edge the cat had in strength and agility could be overcome by bravado.

He took a deep breath, then let out the loudest, most undulating

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scream his lungs and vocal cords could conjure up. And charged, rock in hand.

The cat was disconcerted by these tactics. It was not accustomed to being attacked in this manner. In fact, it was not accustomed to being attacked at all, especially by a creature half its size; it was used to getting things pretty much its own way. So it did the only thing that occurred to its somewhat minuscule brain—it hurriedly retreated several steps to ponder the situation further, almost tripping over its own tail in the process. It thought briefly, then did the next thing that occurred to it—it prepared to pounce.

Now was the time for the rock. Thompson hurled it and rolled to the right.

The rock hit its target dead center, striking the cat squarely in the face as it was pouncing, and completely destroying what was left of its timing and composure. Blinking to clear the blood from its eyes, the cat missed Thompson by several feet. Losing sight of Roland, and not wishing to admit defeat, the tiger in its rage galloped toward Thompson's herders, who, though better armed than Thompson, gave the matter all the consideration it was due—about a millisecond—then broke ranks and fled. Three did not even bother to take their spears.

The cat could only pursue one man, but still half-blinded by blood and fury, it was not willing to let everyone escape. The tiger picked its victim and gave chase.

With no conscious intentions of doing so, Thompson struggled to his feet, retrieved one of the dropped spears and charged the cat while it was still cursorily disemboweling the chosen man.

The cat never saw Thompson until it was too late. The spear was not very sharp, but Thompson's strength drove it through the back toward where he thought the heart should be. The resulting scream immobilized the jungle. Everything gave its undivided attention to this prince of death.

The tiger ignored Thompson and clawed at the spear. Thompson lifted a large rock and brought it down to rendezvous with the cat's head. The tiger looked at him blankly and died, its skull split open. The face of the cat's victim was so mutilated that Thompson could not identify him, but the man was still alive. His eyes opened and stared up at Thompson in delirious fear and Thompson wondered what the man saw. The native put his arms in front of his face as if to answer that question, and continued to moan. The man needed medical skills that would not be perfected for millennia. All Thompson could do was stand and watch the man slowly die.

What if this man was Wisnovsky? Thompson had not come fourteen thousand years into the past to watch his quarry die.

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But what could he do?

When the rest of the band saw that the tiger was dead, they returned. A spear thudding into the ground beside him made Thompson realize that he had outstayed his welcome. The men knew their companion was dying and wanted no evil magic around when he finally succumbed. Nevertheless, Thompson noticed that not one of the men ventured closer to him than fifty feet.

It was the fact that three of the men still had spears that ultimately convinced him that he should leave. The natives were too accurate to continue to miss at their present distance.

As he walked over the knoll and out of spear range he realized that his relationship with the tribe had changed. Yesterday, he had elicited wariness and suspicion. But that was before he killed the tiger. Now there was frank fear, and what was worse, it appeared to be unanimous among the men of the band.

These men—it was difficult to believe that their descendants would build a civilization in these mountains, a civilization that would succeed in many areas where other civilizations had failed.

The thought made him stop abruptly. The Incas had risen high to glory, but then they had fallen. They were falling when Pizarro came, and they were too weak to resist him. The question was *why*? Why did the Incan civilization fail? Why did it fail while Europe flourished?

And suddenly an answer appeared to him. It wasn't the only answer, or perhaps even the best answer, but it was an answer that Wisnovsky, deep within the crevices of his mind, could not possibly have forgotten.

"If the Eurasians operate under the same restrictions that we do, how will Wisnovsky be able to help them?" Thompson asked. "After fifteen days have passed, they won't be able to return him to this century."

The general's jaw tightened. "They can send another physicist back to consult with him any time they want. Progress would be faster if Wisnovsky was doing the work himself, but there would be more danger."

"Why would Wisnovsky cooperate with them?"

"Wisnovsky is a man to whom nothing matters but his work, and he knows that if he dies, there is no one capable of completing what he has started. He also knows that the Eurasians will kill him if he refuses to work for them. Therefore, in his mind, there is no choice."

"I've been told," Thompson said, "that Wisnovsky is a man who values peace above all. He only wants this war to end; he doesn't really care who wins it. Both sides are the same to him."

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"We would never do to him what the Eurasians did—exile him to the past!" The general snorted.

"No," Thompson replied slowly. "We would just kill him."

General Foster whirled and glared at him. "You are only one step from treason. If I had anyone else to send—"

"You don't," Thompson interrupted. "However, I will withdraw voluntarily if you so wish."

"That would mean no one would go."

Thompson said nothing.

"It would be the same as surrendering to the Eurasians!"

"Yes."

A thin balding man who walked with the crouch of a chimpanzee bounced over to Foster and bobbed his head, gave the general a small brown box, then returned to the control panel.

General Foster eyed Thompson. "You have never disobeyed an order of mine yet."

"I won't now," Thompson said. "If you send me after Wisnovsky, I will find him."

"And bring him back."

"I will do my best to ensure that he is no longer any use to the Eurasian war effort."

The answer seemed to satisfy Foster. The furrows of concern disappeared from his forehead. He handed the box to Thompson.

"There are a few tools in here—a saw, a hammer, a knife, some nails . . . and a blaster. Don't use the gun unless your life—or Wisnovsky's—depends upon it. But if you get into trouble, don't hesitate." He motioned for Thompson to step inside the metal loop. "I hope the surgeons did a good job putting in that return control. No doubt it is uncomfortable, but we had to put it in a place where it was easily accessible, yet somewhat safe from ordinary blows that might accidentally trigger it. In addition, the surgeons had only thirty minutes to put it in—they didn't have too much choice."

Thompson felt under his arm for the ceramic button that was implanted there. "I can live with it," he said.

"Then you're ready?" the general asked.

Thompson glanced down at his fur cape, leather foot-wrappings, and the deerskin loincloth that constituted his traveling wardrobe. "I guess so."

"We'll try to put you right in the middle of them," the general said.

Thompson staggered up and gazed at his creation. It was clumsy and there was a good chance that it wouldn't stay together very long, but considering his limited carpentering experience and his meager supply of tools, it had few peers in the annals of technology. Of course, that was his opinion and it might be said that he was biased.

He rubbed his eyes, as if to rub away some of his weariness. He

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had slept little since the fight with the tiger several days ago—how long exactly? he wondered. Exhaustion was a visitor he continually had to drive away from the door of his mind. He looked at the sky and saw that sunset was approaching. Or was it? The sun was glimmering palely over the mountains, but was it in the east or the west? His orientation was gone.

After a moment he remembered that he had been working all day, so that it must be almost sunset. Almost night, almost time to sleep . . . but he couldn't sleep, not yet. There would be time for that later. It wouldn't be wise to remain in the forest any longer than absolutely necessary. Luck was a capricious companion, and though it had been with him so far, there was no point in deliberately testing its friendship. He had met all the saber-toothed tigers he ever cared to meet.

Controlled by some part of his brain that still retained the power of reason, he seized his creation and started pulling it toward the cave, three thousand feet above. The tools and the blaster he left scattered on the ground. The blaster's power supply was dead; he had exhausted it using the gun to cut the wood.

The band—was it still there? His memory skipped—had anyone been at the cave when he went back to pick up the tool kit he had buried near the entrance? He tried to think, but only unrelated images flickered in his mind, one blazing for a second, to be replaced by another, then another. The face of the dying victim of the tiger, the shadow in the mouth of the cave, the spear so poorly thrown, the tiger again, the tiger . . . that gaping pit of a mouth smiling at him, its teeth the size of spears . . .

Jagged rocks sliced into his feet as he climbed and fought for mental control, their merciless points claiming blood as their toll for passing this way. What had happened to the leather wrappings that had covered his feet?

Rest . . . he needed rest. How far had he come? He could not stop yet. He knew somehow that he must go on.

The face—that dying face. What if it had been Wisnovsky? He would be too late. He would have failed.

Oh yes, now something focused. He saw the face again. Only it was far away and lying with its body on a rock in front of the cave, a new fire burning nearby. Not close to the cave at all.

Another man appeared by the rock. A tall blond. He knew it was himself. He uncovered the tools and slid away, down toward the forest. The band had still been there—was it still there now?

He had to rest. Each muscle screamed with pain as he moved it. He could hear the sound as it contracted. His lungs ached from the

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cold, thin mountain air that taunted him by giving him just enough oxygen to keep him alive, but not enough to allow him to catch his breath.

But he dared not pause, for he knew he'd never find the will to lift his feet again and start them moving.

The landscape blurred. What if the band had gone? He had no strength to follow them. Or time. How long did he have left? Or was it already too late? His lungs grabbed each gasp of air and clung to it, reluctant to exhale.

Darkness ruled the night, and exhaustion was conquering him. No farther. He could go no farther. And the darkness in his mind and the darkness of the night merged, and the ground rose up to meet him, though he was not aware of its welcome.

The stars were still visible when he awoke. He wondered how long he had slept. There was no moon and he could not tell what time it was from the stars. Nevertheless, he stared up at them and was suddenly struck by an overwhelming awe and loneliness.

Maybe there were some things forever beyond the reach of man, he thought. Maybe the stars were never meant for anything other than to hide the infinite blackness of the universe from the eyes of man.

Maybe.

But there was a part of Thompson that couldn't believe this. Earthmen had walked on the Moon, Mars, and several of the moons of Jupiter. Then the war had come, and there had been no money left after the weapons had been bought. Only when the war ended would mankind be able to turn its efforts back to the stars. If there was anyone left to care about such things.

Thompson blinked his eyes and surveyed his surroundings. He was lying less than a hundred yards short of the cave, but he was still too tired to feel any jubilation. If he had been as tired under ordinary circumstances he would have slept for at least a day, but the circumstances were not ordinary in any sense, and some clock in his well-trained mind had allowed him just enough sleep to provide him with the energy to complete his task, then had awakened him.

In front of the cave, not twenty yards away, was a fire, and by the fire was the body of the native mauled by the tiger. Perhaps it was Wisnovsky. Whoever it was, however, was dead now. Thompson thought for a moment. The man must have just died, probably shortly before or after sunset, for the band would not have allowed a dead body to lie around very long.

There was no sentry that he could see—no doubt they assumed the fire would keep the animals away. Thompson stood up. He

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could not have planned a better test. All he needed for success was one spark of memory in one man's head. Or even one spark of curiosity, for combined with the intelligence that one man possessed, it might be enough.

The morning sunlight invaded his sleep like a sword plunged into his mind. For several minutes it stayed lodged there, severing his memories from his consciousness. He struggled to remember where he was, and why he was lying in the shadow of a rock by a cave in the side of a mountain.

The past returned quickly, rushing in when he pulled his head back within the shadow and out of the sunlight. He hoped that the native who was Wisnovsky would be able to recall his own identity as easily.

Thompson watched the cave for one hour, then another. Finally, when the sun dangled about forty-five degrees off the horizon, they came out, moving swiftly at first, then stopping abruptly as they noticed what the body was lying on. Each looked at the chief, but he did nothing, said nothing.

Thompson sought out familiar faces, Brutus, Cassius, Ugolino, the chief, the two unnamed men—where was Judas? But the question was rhetorical, for he knew the answer.

There were two questions he could not answer, however. Was Judas in reality Wisnovsky? One chance out of four, he thought, assuming that Wisnovsky was a member of this small band. And if that assumption was wrong? What then? But he found he could not stand to even think about such a possibility.

Words floated across to Thompson's hiding place behind the rock. Several people were talking frantically, but Thompson couldn't identify any of the voices.

Then the chief shouted and there was suddenly silence. Every eye gazed at him. The chief stood briefly staring at this new, frightening thing that squatted before him, then whirled, said something to the band, and fled back to the cave. The others followed without hesitation—except for Ugolino's mate. For several minutes she remained by the body, her head bowed, as if in mourning. A voice called angrily, and she finally joined the rest of the band in the cave.

Fear.

The emotion that ruled their lives was ruling history now. Fear had been a part of man's makeup in the beginning, and it would still be with him in the end. Even in the Twenty First Century wars would be fought because of fear. Once, in man's far distant past, it had been an advantage to trust only the known and fear the unknown, but in the time Thompson still considered to be his present,

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this instinct had become a curse. The strange, the different, the unknown—all were hated because of fear. Was it too much to depend upon one man to be able to conquer that fear?

The sun fell behind the mountains and rose once more before the band ventured out of the cave. Several of them showed a little more courage and walked hesitantly up to the body: Ugolino, the chief, and one of the unnamed men. Behind those three, Ugolino's wife watched the proceedings with more interest than fear. She glanced from side to side as if searching for something, then she scowled and fixed her gaze on the rock behind which Thompson was concealed.

Was it possible that she was Wisnovsky? Sex changes were not uncommon, but it seemed so unlikely. So unnecessary.

A voice trickled across the distance and the chief started, snapped around, and slapped Ugolino. The latter retreated, pointed to the body, then to himself.

The chief shouted in reply and everyone retreated to the cave again. Thompson leaned back against his rock and swore in disgust. Just one seed of an idea, that's all he needed to get across to the man who used to be Wisnovsky. Just one seed and the spell of the psychotransformation might break.

He stood up. They would not try to kill him now. They were too afraid.

His back arched toward the sun, Thompson started for the cave. Courage had saved him before, maybe it could help him now.

The band did not see him until he was inside the cave. As he waited for his eyes to grow accustomed to the darkness, he expected to feel the flinty point of a spear penetrate his chest. Under ordinary conditions, that's probably what would have happened. But the band was so distraught by present conditions that it never occurred to anyone to attack Thompson. Everyone just stood and trembled. Everyone that is, except Ugolino. He hadn't even noticed Thompson's entrance. He stood off to the side, his eyes glazed, staring outside.

As Thompson watched, the band edged closer to the entrance of the cave, and all at once broke into a run, racing outward, screaming and moaning.

Only Ugolino remained. He glanced outside, back to Thompson, then outside again. Thompson began to walk toward him.

"Stop where you are," a voice behind him ordered in perfect English. "Turn around slowly." Thompson obeyed, and found himself staring down the throat of a sullen black blaster.

Such a strange thing, the man thought as he stared out from the dark safety of the cave. It had ap-

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peared during the night, and now it still remained, holding the body of Slevenon in its wooden palm.

Was it evil . . . or good? The man rubbed his head, then squeezed it between his hands, hoping to drive out the evil spirit which had been causing him pain since late last night.

That object—it was familiar—but how could that be? He had never seen it before. Or anything like it.

Or had he?

He couldn't remember. The pain was stronger now and throbbing and his memories were spinning in his brain like the Earth on its axis—what?—spinning, dissolving, flickering. Tomorrow, yesterday, both were gone, now there was only the present.

One part of the structure was the most important. The two round objects on each side . . . what were they for?

The man stepped closer to the mouth of the cave. He started to walk outside, but his mate grabbed his arm.

"I must go," he said, shaking free.

"It is wrong," she pleaded. "It is not safe. I feel the evil in it."

He gazed down at her, and saw her differently than he ever had before. He did not love her. Thoughts of a woman he *had* loved floated through his mind. So long ago—so far away.

He shook his head violently. The demon was eating his mind. These thoughts could not be his. But then, whose were they?

So absorbed was he in his own pain that he failed to see the pale shaman approach. And when he finally noticed the strange one, he was no longer afraid.

The other members of the band trembled. He wanted to tell them not to be afraid, but the words would not come. He couldn't remember how to say them.

There was an emptiness in his mind now, spreading slowly, as the darkness spread slowly to cover the light when the sun left the sky.

His eyes sought and found the body of Slevenon, and the object it rested upon. The square platform partially supported by two wooden discs, the large straight branch connecting the discs . . . it was all so impossibly familiar. The discs, he wanted, he needed, he was compelled to give them a name, but in his consciousness there was no name.

At that moment the band yelled and streaked from the cave. As they ran, one of the men grazed the side of the platform—

And it moved. It slid along the ground.

The word—what was it?

It *rolled.*

And all the memories of all the future-past came gushing through the shattered psychotransformation dam, drowning his consciousness momentarily, washing away all his mental control.

When the flood receded, and he cleared enough debris from his

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mind to make sense of what remained, the woman who was supposed to be his mate was holding a blaster on the blond man.

"I should have known," Thompson said.

"Yes," Ugolino's mate replied tersely. "You were stupid to think we would send Wisnovsky back without a guard."

"And you're no doubt the one who tried to kill me with the spear that night," Thompson said. "Actually, as I remember, your form wasn't too bad—you must have taken your eyes off the target."

"You may laugh if you wish now, but you will find that death dampens your sense of humor."

"The ultimate solution," Thompson muttered. "Because you don't know what else to do with me, you kill me."

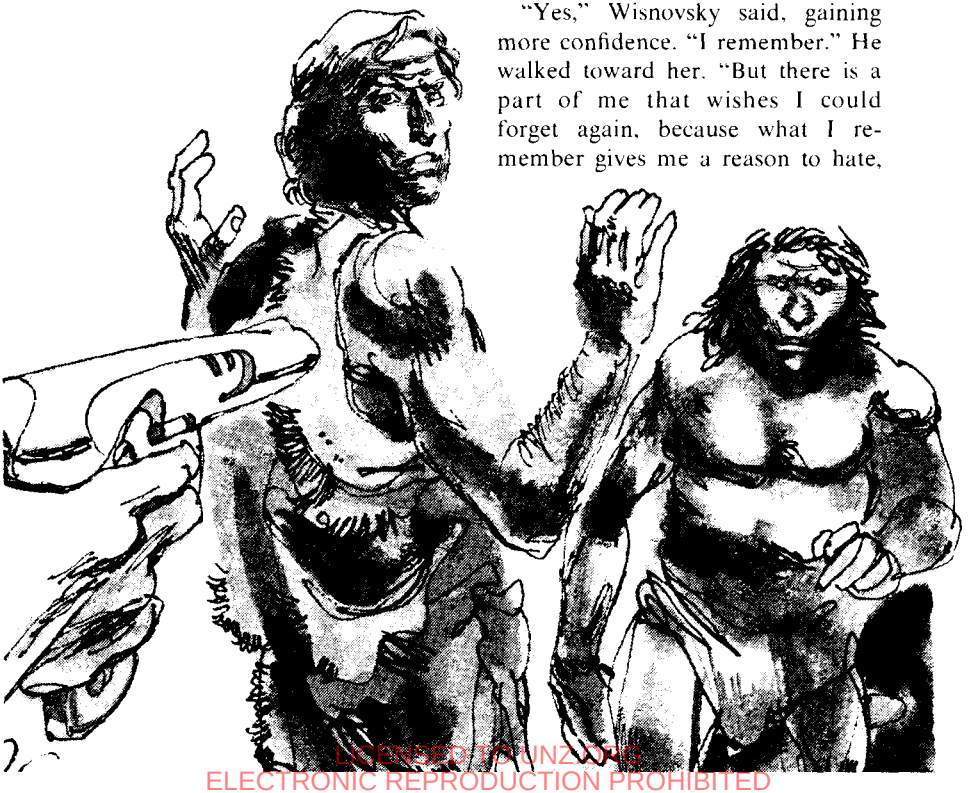
"Yes," she agreed. "You've done enough damage already."

"Ah. Then Wisnovsky is remembering."

Wisnovsky listened to the conversation, waiting for what he felt was the proper time for him to intrude. This was it.

"I . . . I have remembered," he stuttered, trying out his command of this new, yet familiar tongue.

"Yes," Wisnovsky said, gaining more confidence. "I remember." He walked toward her. "But there is a part of me that wishes I could forget again, because what I remember gives me a reason to hate,



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and hating is against everything I believe in."

"You won't feel any hatred after another psychotransformation," the woman remarked.

Wisnovsky stared at her, and Thompson thought he could see a cold fury in the physicist's eyes. "When you first captured me," Wisnovsky told her, "you gave me a choice—either psychotransformation or death. I have now seen the consequences of my decision, and I will never agree to undergo any form of mind-shaping again. My mind is all I have. It is *me,* and when you changed my memories and my thought-processes, you changed me into someone I have no desire to ever be again."

"If you fight it," she said, "you will die."

"I thought before that my work should be carried on regardless of the sacrifice required, so I chose psychotransformation over death. I was wrong. Man is not ready for the temporal equations. It is best that they be forgotten. Therefore, I won't undergo a psychotransformation again. If I cannot live as myself, with *my* mind and memories, I will choose not to live at all."

Thompson started to speak, but Wisnovsky cut him off.

"Just because I am angry with her people is no reason to think I find you Americans any less distasteful. You're no better than the Eurasians. Your purposes are just as bad."

Thompson didn't reply because he saw that the woman had shifted her attention to Wisnovsky. He watched her carefully for an opening.

"One side has to win," she said.

Wisnovsky scowled. "It won't be with my help."

She pressed him. "Does it matter? It's inevitable that someone, sooner or later, will be able to finish the work you've begun. Why don't *you* do it and save mankind a hundred years of difficult research? Besides, you can't be too eager to die."

"I'm not," Wisnovsky interjected. "And I hope to live out my normal lifespan, even though it seems that my destiny, like yours, is to eventually die here fourteen thousand years before I will be born."

The woman did not recoil in surprise, she did not flinch, her gun did not waver, but she did blink. That was enough. Thompson moved. One step, one fist into her jaw, and she was bouncing against the wall of the cave, gaping as she slid down the wall onto the floor.

The blood pouring from her mouth and the twisted angle of her neck told Thompson that Wisnovsky's prediction was fulfilled.

"You deliberately distracted her," Thompson said.

Wisnovsky went over and knelt beside the woman. "Yes, but I only wanted you to disarm her."

"That's all I intended to do."

"I had hoped she would be able

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to stay with me." He paused and glanced up at Thompson. "Of course, you no doubt expect me to go back with you. I wish I could. I'm a civilized man and interesting as this period is from a scientific point of view, I don't belong here. Nevertheless, I must stay."

"Why?"

Wisnovsky nodded, pointed to the cart outside. "The wheel—it is the foundation of civilization. Both East and West invented it, but the West never used it for anything other than children's toys, while the East built an entire civilization upon it. Possibly it's more than a coincidence that our Twenty First Century culture has Eastern roots.

"It was a clever idea to build that cart," Wisnovksy went on. "It was the impetus that cracked the wall imposed by the psychotransformation. The principle of the wheel is virtually instinctive to a man from our culture, yet it is a principle that few primitives would readily grasp."

"The first part of my mission was to identify you," Thompson remarked. "I have accomplished that. The second part is to bring you back with me. I intend to accomplish that." He stepped forward.

"I am weak, you are strong. I am a pacifist, you are trained to kill. I can't resist you if you want to take me back. But neither will I ever work on my temporal equations again—for either side.

"You asked me why I must stay. I'll tell you. I am no asset to the Twenty First Century. I can bring it only death. But here I can be useful. My equations predict that the stream of time can be changed. I can test that prediction by staying here.

"It's tragic really," he went on. "Mankind had everything: talent, ambition, intelligence, vision, creative energy. There was nothing we couldn't do—even the stars were within reach. Instead, man preferred to fight."

"To visit the stars requires a faster-than-light drive. I've never heard of one being invented."

"The principle is simple. With one modification of two of my equations the stars become accessible."

"Perhaps if man had known that secret, it would have ended the war."

Wisnovsky shook his head. "No, I don't think so. Man isn't mature enough as a race to be trusted with such power. At least now he only mutilates his own world, but to set him loose among the stars .'. . not until a civilization arises on Earth which values peace above war would I give man the secret of starflight."

Thompson shrugged to hide his feelings of despair. "It's your choice."

Wisnovsky smiled. "If you allow me to stay here and you return, you might find that you are the only person in the world to know

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my equations, and the secret of starflight. Then perhaps it will be your choice."

"But I don't know the secret."

"I'll tell you." And he did.

Thompson received the knowledge with misgivings. He stared uneasily at Wisnovsky, not sure how to verbalize his doubts.

"I can sense what you're thinking," Wisnovsky said, "and you're right. I can't predict how the future will be affected by what I do now. There are an infinite number of possibilities. I may even be able to significantly alter history, and *still* not end the war that is responsible for us being here."

"If you stay," Thompson said, "you'll never know what effect you've had."

"But if I go, I'll never have any effect at all."

Thompson could find no answer, for his mind was filled with thoughts of Armageddon. The wars, the killing . . . maybe nothing would change, maybe a new start would make no difference, but it seemed worth the chance.

"What about me?" Thompson asked. "If the time program no longer exists will I still be able to return to the Twenty First Century?"

"Yes. Energywise, your atoms belong to that time period. You will snap back."

"And what about you? What if the Eurasians come back for you?"

"The band has already decided to move from this cave. The Eurasians will never find us. Besides, when they discover that my mate is dead and I am gone, they will no doubt think that you Americans have me." He paused, then asked: "Will they be right?"

Thompson temporarily evaded the question. "And what if the Eurasians push your recall button just to make sure?"

"They won't, because there isn't one for me. I am self-sufficient in this period. Even the power supply keeping me back here is hidden in these mountains."

"It must be small."

"Less than a cubic foot, but it will last the six months necessary for all my atoms to be exchanged with those of this time period. The unit was one of my first contributions to the Eurasian program. And now it will save my life if you allow me to stay, because it is light enough to carry to a new hiding place before the Eurasians realize what has happened. They will again think that you Americans are responsible."

Thompson fingered the blaster as he thought. There wasn't even a glint on the black steel barrel—it seemed to swallow up what little light managed to penetrate into the cave. He looked at Wisnovsky, then tossed the gun to the physicist.

Wisnovsky caught it, and glanced up, puzzled.

"You might need it around here," Thompson said.

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Wisnovsky shook his head. "A civilization founded upon violence cannot endure." He unscrewed the stock and ripped out the power charge.

"What about their spears? And their hunts? That's violence."

"I would be a fool to think I could change them into passive vegetarians. I have to accept a certain amount of violence. They live in a hostile environment. Even the killing of other men is sometimes unavoidable."

Thompson followed Wisnovsky's eyes to the woman lying on the floor of the cave. There was nothing left to be said, and no time left to say it anyway, for voices outside informed Thompson that the band was returning. He glanced at Wisnovsky, then again at the woman, and pressed the ceramic button under his arm, wondering as he did so if General Foster would still exist, and what the general was going to say when he returned . . . alone.

The Most High Sun Priest of the Incan Empire pulled his robe away from his feet and took the final step to the top of the small pyramid. It was night now, but to the east the sun was pulling back the blanket of stars from over the Earth.

For a moment the Sun Priest just stood there, letting the dry, chilly desert wind ripple through his white velvet robe. Then a thunder to the north made him turn in that direction, where he found three dirty gray ribbons draped across the night. As he watched, the ribbons lengthened toward the east where they vanished into sunrise.

"The interceptors fly closer every day, sir" his companion, the Archpriest of the Northern Continent, remarked, continuing to stand a respectful five steps down from the top of the pyramid.

The Sun Priest said nothing, but he, more than anyone except for the Inca himself, was aware of the facts. With each mission the deadly interceptors from across the sea came farther south. And after them came the even more feared bombers, which leveled city after city. Soon this entire northern continent would belong to the powers from the East.

The war was going badly for his people. Since the very beginning, when Pizarro came, it had been going badly. Pizarro had been defeated, but others had come: the Portuguese, the French, the English, more Spanish . . . all after land and gold. For over five hundred years his people had been trying to defend their land from the white invaders from the East. Never had the Incas been a nation of war, fighting only when they had to, conquering only to set others free, such as the peoples under Aztec rule; and now the Sun Priest could see the day when the white races would finally reign over the two continents which had always been Indian. There was only one chance of survival for his people.

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And that chance was the reason he was here today.

"Are you sure this is the right time and place?" the Archpriest asked.

The Sun Priest chose to overlook this expression of doubt. There were too many other things on his mind now. "The blond shaman will come. He must come. The starships are ready. We need only the equations he carries in his mind to make the starflight engines."

"And what if he doesn't know the equations?"

"Archpriest, you seem full of doubts today. Don't you believe what is written on the tablet?"

"Of course, sir. I beg your forgiveness."

"It is granted." But the Sun Priest could sympathize with his companion's concern, for there was much the Archpriest did not know. The Archpriest knew of the man named Wisnovsky and the first tablet he left telling of the coming of the blond shaman, but he did not know about the second tablet of stone that Wisnovsky had left, for it had been passed down from Sun Priest to Sun Priest from the very beginning of the Empire. Now only he, the present Sun Priest, and the Inca himself, knew what was inscribed upon it; only the two of them, of all the Incas, knew of the other timeflow which could have existed but did not because of the knowledge Wisnovsky had given their ancestors. And while all the priests knew that the blond shaman could save them by revealing the secret of starflight, only he and the Inca knew why Wisnovsky had chosen not to transcribe his equations upon stone, but rather relied upon this time messenger to bring them.

The Sun Priest blinked and turned away from the rising sun. He tried to imagine what the Incan Empire would have been like in the other timeflow. Without iron, without the wheel . . . how could Pizarro not have defeated it? But no matter how backward and barbarian those other Incas would have been, he still thought of them as brothers.

Wisnovsky had kept the good parts of the old way, and discarded the bad, and the prosperity which resulted had given the Empire little incentive to change, especially in comparison with the civilization which had arisen across the sea. Only the knowledge of iron and the wheel had enabled the Sun Priest's people to delay the conquest.

But it had only been a delay, not a victory, and now the starships stood waiting to take them from this world. For thirty years the starships had been ready, awaiting the arrival of the blond shaman. Now the wait was almost over, for he was due to come this morning, here in the desert on this chilly day in early spring.

And the blond shaman, who held the key to starflight in his mind, would decide whether, at last, man was ready for the stars. ■

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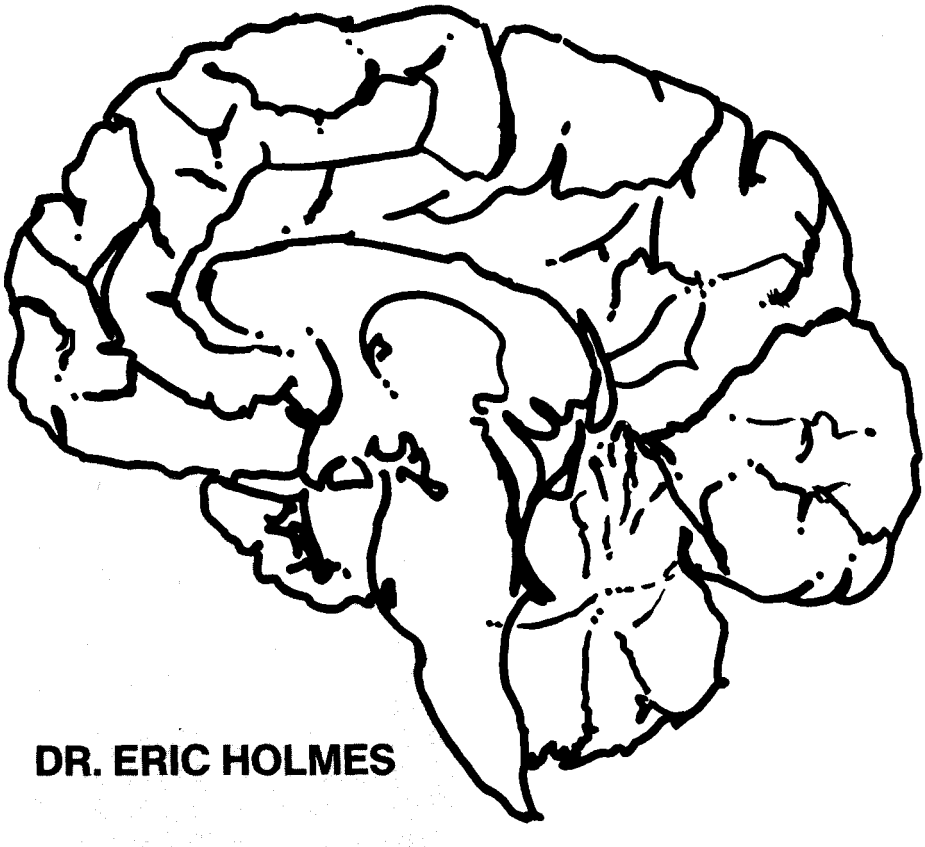

DR. ERIC HOLMES

THE SPLIT BRAIN

When your left hand doesn't know what your right hand is doing, you might be able to do two jobs at once!

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One of the most obvious things about the human brain is that it is made up of two symmetrical halves, each the mirror image of the other. While there are a number of vital structures at the base of the brain, the vast bulk of it is made up of the paired hemispheres. These include the cortex, where the higher decision processes appear to take place, as well as certain subcortical structures concerned with sensory perception and motor movement.

Each half brain, or hemisphere, is concerned with nerve impulses from the opposite half of the body. That is, the right hemisphere receives sensory information from the left side of the body—arm, leg, trunk, face. In addition, motor control of one side of the body is the function of the opposite side of the brain. The paralysis which follows a "stroke" involves the limbs and face on one side and is characteristically due to injury to the brain on the other side. The elaborate crossing of sensory and motor pathways inside the brain that brings this about has been carefully worked out and is similar in every mammalian species studied. Vision and hearing are special cases and are discussed later.

Why nature chose to design a communications wiring network in which all incoming and outgoing signals must be shunted to the opposite side once they get into the skull remains a complete mystery. There is no apparent advantage to this left-right reversal of signals; the only thing that can be said in its defense is that it obviously works!

In man the cortex of the brain hemispheres is more highly developed than it is in any other species (with the possible exception of the dolphin), and this cortex is responsible for such highly human functions as speech and writing. It is in relation to some of these abilities that the brain shows remarkable localization of function to one of the hemispheres.

The two hemispheres do not operate in isolation. There are a number of bands of nerve fibers crossing the midline, carrying messages from vital areas on one side to those on the other. In the mammal, there is a great bridge of fibers, the corpus callosum, which crosses the midline and connects cortical areas of one side with symmetrical areas on the other side. It is only recently, however, that we have gained much understanding of the functions of these inter-hemispheric connections. Early observations of experimental animals and human patients with the corpus callosum destroyed have revealed startlingly little in the way of symptoms—motor, sensory or psychological. Learning new tasks or performing old ones—sometimes including complex motor movements of both upper limbs—seemed normal. Since the easiest way to locate a particu-

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Figure 1. Looking at the inside surface of the right hemisphere of the human brain. The corpus callosum, the midline band of fibers connecting the cortex of the left and right hemispheres, can be easily seen under the arrow.

lar function in an area of brain is to see if it is lost when the area in question is surgically removed, it looked as if the early experiments led only to the conclusion that the large mass of fibers in the corpus callosum had no function at all! Further study has proven this not to be the case.

The functions of the corpus callosum are revealed by the ingenious experiments of the "split-brain preparation," most of which are the work of Dr. Roger Sperry's laboratory at Cal Tech. To understand these experiments it is first necessary to consider the way the visual system handles information.

In animals with eyes far out on the side of the head, the left eye sees everything in the "visual field" to the left and the right eye everything to the right. In such species the nerve fibers from each eye all go across the brain to the opposite hemisphere and its visual areas. In animals whose eyes look forward, the "visual field" of one eye overlaps that of the other, and the brain connections are more com-

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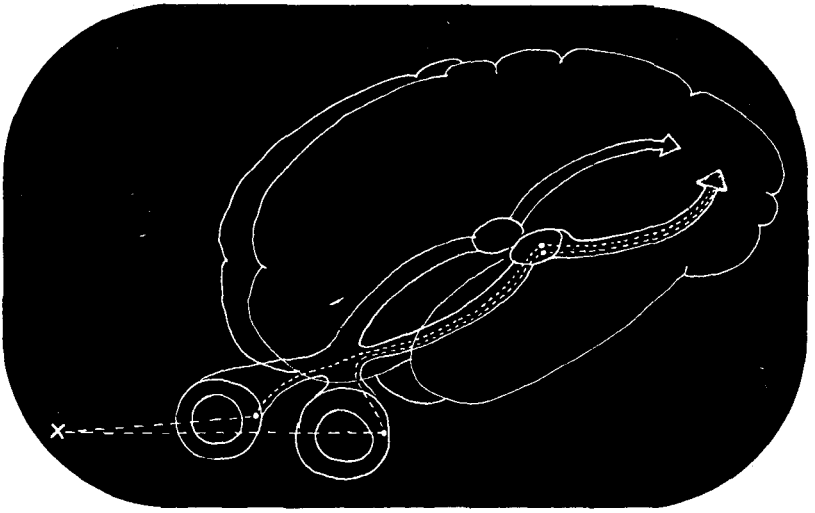

Figure 2. Light from an object on the right side at "X" strikes the retina of both eyes and is transmitted back into the brain over the visual nerves, eventually arriving at the visual cortex in the back of the brain. The fibers carrying information from the right side coming from the right eye cross to the left hemisphere behind the eyes at the optic chiasm. Everything seen to the right is seen only by the left hemisphere. This division is complete and passes directly through the center of visual gaze, dividing the visual world into right and left halves.

plicated. In the cat, the monkey, or man, most of the visual field is seen by each eye and the field can be divided into left and right halves by drawing a line through a central fixation point. Under these conditions, everything seen to the left of the midpoint of the field, with either eye, is transmitted to the right brain hemisphere. Everything seen in the right side of the visual field is transmitted to the left hemisphere. Vision, then, respects the crossed transmission rule, but this necessitates the crossing of half the fibers from each eye to the other side, while the other half of the fibers do not cross (Figure 2). The crossing fibers form a structure that is called the optic chiasm.

The auditory system ignores the left-right crossed connection rule and information from both ears appears to be mixed and transmitted to both sides of the brain about equally.

In the split-brain experiments, the crossing visual fibers of the op-

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tic chiasm are cut as well as the corpus callosum (and usually some other crossing bundles). Cutting the visual fibers renders the animal half-blind in each eye, but the fibers connected to the hemisphere of the same side continue to function and the visual loss is not serious.

In the split-brain animal the sensory information from one eye goes only to the hemisphere on that side, and does not get to the other hemisphere across the corpus callosum because it has been cut. It is possible to train one eye-and-hemisphere combination by putting an eye-patch over the other eye. Such a problem might be to choose one of two symbols, pressing a panel painted with a symbol to open a food box or activate a switch which delivers milk or food pellets. After the animal learns to choose the correct symbol, the other eye-brain combination can be tested by patching the "trained eye." A normal animal has no trouble with this switch and continues to make correct choices, but the split-brain animal behaves as if it had never seen the problem before and has to learn it all over again, taking as many trials to learn as he did the first time (Figure 3).

The split-brain animal can form memories in one brain hemisphere independently of the other. In the experiment above, for example, the cat or monkey can be taught with one eye to choose one of two symbols, and with the other eye (switching the patch) to choose the other. The two hemispheres learn at a normal rate, seemingly not the least confused by the fact that the opposite hemisphere is learning the reverse of the problem! In subsequent testing the animal always chooses the "correct" symbol for the eye it is using, each side of the brain having learned a different set of memories. One would suspect that with both eyes unpatched, the two sides of the brain would conflict and the animal would be paralyzed with indecision. This has been tested, however, and in such animals one hemisphere seems to "take over" with little effort, and the animal gives a consistent response.

Similarly bizarre behavior can be produced in the split-brain animal by training one paw and then testing the other. The trained paw can be taught to press one of two pedals, one rough and one smooth, to get food. When the other paw is tested, it shows no sign of having learned anything. This is because sensation from one paw goes almost exclusively to the opposite hemisphere's sensory cortex. Without the crossing fibers of the corpus callosum the information does not get to the other hemisphere controlling the other paw. Normal animals with an intact corpus callosum make the transfer from one paw to the other easily.

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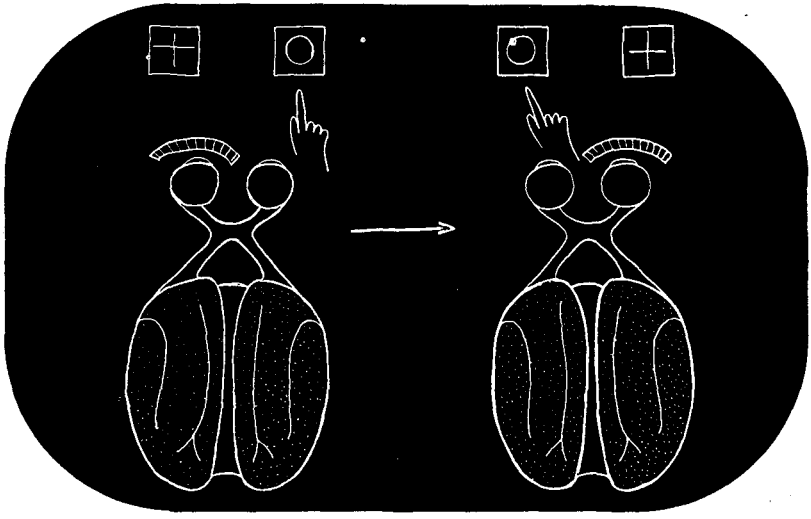

Figure 3. Sperry's Split-Brain Animal.
A. Normal animal with intact optic chiasm and corpus callosum is first trained to choose one of two panels (the circle) with the left eye blindfolded. When tested with the right eye blindfolded, the correct choice is immediately made.

Lateralization of Function in Human Brain

The human brain resembles that of the cat or monkey in that all the information from one side of the body goes to the opposite hemisphere, which then controls the movements of the limbs on that side. The visual field is divided exactly in half, the left half being handled by the right hemisphere, the right by the left hemisphere. The human brain, however, has a capacity for dealing with symbols, speech and mathematical abstractions. Here we find not half of the function served by one side of the brain and half by the other side, but a strong tendency for special functions to be localized to one hemisphere.

The best evidence for this is a disorder called aphasia. Some patients with aphasia have a total loss of speech, but most have only a partial impairment of communication. Depending on the size and location of the brain injury, the patient may be able to say "Yes" and "No" and nothing else, or be able to use a large number of words but not put them together in good sentences: "No, I have been very fort that way, I have no versickled in a ver long ver time." Or, he may simply have difficulty in finding words when he wants them.

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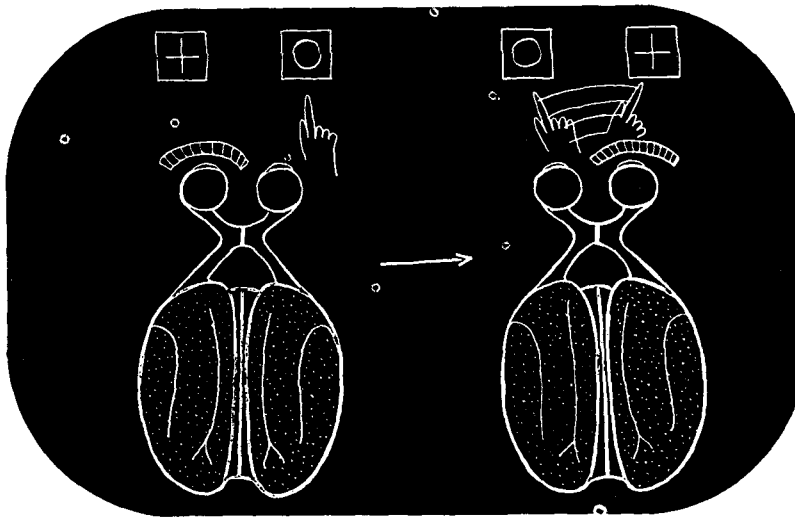

B. Split-brain animal with the chiasm and corpus callosum cut is first trained with the left eye blindfolded. After transfer of the blindfold to the right eye the animal shows no knowledge of the correct response, must learn the task over again with the other hemisphere.

Looking at a key he may say, "That's a lock, no, no, a kick, kick, damn! I know what it is, it is for opening, opening, you know."

Patients with this kind of trouble in speaking almost always have injuries to the left hemisphere of the brain. Similarly placed injury to the right hemisphere (in most people) produces no difficulty in speech whatsoever. The left hemisphere is said to be "dominant" since it is necessary for communication. Left-handed people may be exceptions to this rule, since they can sometimes sustain injury to the left hemisphere without aphasia or have aphasia as a symptom of right hemisphere disease. Not every left-hander has a "dominant" right hemisphere, however. Many who have strokes or other injuries to the left hemisphere do show some aphasia, so that the relationship between "dominant hemisphere" and handedness is probably more complex than present understanding would indicate.

People who have injuries to the cortex of the right hemisphere usually have no speech difficulty, but they do have some strange, special symptoms. Right hemisphere lesions characteristically produce some degree of paralysis of the left side, some loss of sensation of the left side and some loss of vision to

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the left. In addition, however, such patients often have two other symptoms: difficulty in perception of the left side and difficulty in dealing with geometrical figures, maps or other nonverbal, nonarithmetic symbols.

In an extreme example of the difficulty with the left side of things the patient may deny the existence of his own left side. "Is this your arm?" "No." "Seems to be attached to you." "No, it isn't mine, it must be yours!" Such patients may complain that there is another patient in bed with them—they have discovered the paralyzed left arm or leg and failed to recognize it as their own! It can be emphasized that patients with left hemisphere injuries, despite their aphasia, do not make these mistakes.

More commonly the right hemisphere injury produces a difficulty in perceiving the left side of other objects, and trouble in copying figures or constructing geometric patterns from sticks or blocks, as demonstrated by the patient's drawings in Figure 4.

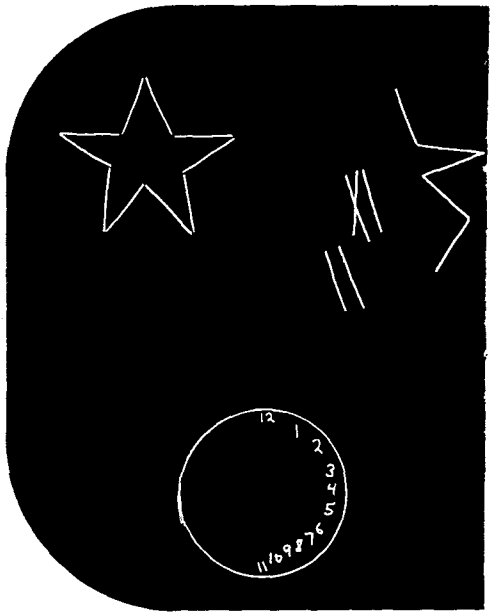

Figure 4. Tests for injury to the cortex of the right hemisphere. Top, on the left, patient is shown a star made with matchsticks and then given the sticks. After ten minutes he is only able to produce the figure on the right. Below, the patient is given a circle and told, "This is a clock. Put the numbers in place." Again he ignores the left side entirely, seems quite satisfied with the results.

To generalize (a dangerous thing to do where the human cortex is concerned because of the great variation between patients), the left hemisphere seems to be concerned with speech (and the written word) while the right hemisphere is unessential for speech but has something to do with perception of relationships or patterns. Now let us turn to the human "split-brain preparation."

Destruction of the corpus callosum by injury or disease is very unusual, but a small number of patients have been operated on and the corpus callosum and other fiber

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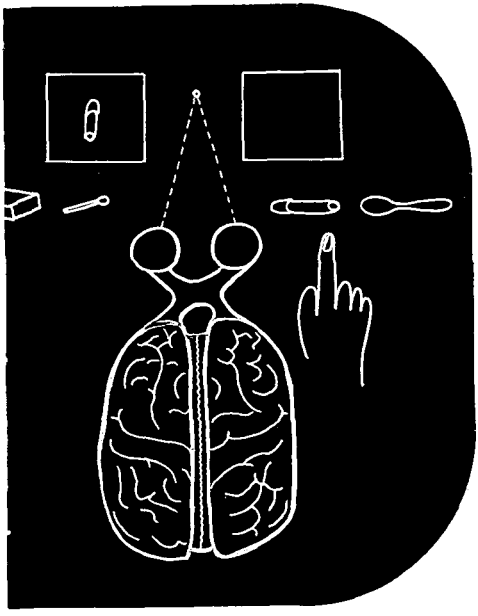
tracts (except the visual chiasm) deliberately cut. One would certainly wonder what possible reason there could be for such an operation.

In rare cases of epileptic seizures the fit begins on one side of the body and spreads rapidly until it involves all of that side, and then the other side, at which time the patient usually loses consciousness. Such "focal seizures" begin in the cortex of one hemisphere and, when they spread, cross the corpus callosum. Cutting this band of fibers results in limiting the seizure to one side; this reduces its severity and means the patient is less liable to be injured during an attack. It is in such cases that the operation has been performed, always with some degree of benefit to the patient.

Figure 5. Gazzaniga's Apparatus For Testing the Split-Brain Patient. Patient focuses both eyes on a point between two projection screens. Pictures are then projected briefly onto screens by concealed tachistoscopes. Identification can be made by pointing to appropriate object on the table, or by naming.



Since the visual fibers in the human patients are not cut, it is necessary to modify the Sperry testing apparatus in order to test the effects of the operation. Figure 5 shows how this can be done by having the test subject fix his gaze on a central point and flashing pictures or words on screens in the left or right visual field.

A simpler way to test the hemispheres separately is to ask the subject to feel an object in one hand without looking at it. Under these circumstances, the first striking finding is that objects placed in the left hand of the split-brain patient cannot be named! The left hand may show that it recognizes the object by feeling through an assortment of objects and coming up with another similar object or by pointing at a picture of the object, but the patient is unable to say or write the name of the test object. Placed in the right hand, which communicates with the speech areas in the cortex of the left hemi-

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sphere, the object is quickly named.

Using the special test apparatus shown in Figure 5, pictures shown on the left are projected to the right hemisphere. They cannot be named—as a matter of fact, when asked what he saw the patient usually says "Nothing"—but the right hemisphere can indicate that it did see something by pointing to a similar object or picture (often with either hand!). Pictures or words shown in the right visual field can be named aloud and identified in nonverbal ways as well.

The right hand can write—both spontaneously and from dictation. The left hand, however, cannot write even so simple a thing as the patient's name, although it may be able to copy printed words.

The right hemisphere, when contacted in ways that exclude participation by the left hemisphere, appears to be mute. However, by pointing, locating objects, et cetera, the right hemisphere can communicate with the examiner, indicating that it understands the instructions given to it, even though these instructions are, of necessity, verbal in nature.

This characterization of the right hemisphere is complicated by two factors. One of these is that the right hemisphere seems to be superior to the left at some special tasks. This is more fully discussed later. The other complication is the ability of the brain to learn and correct itself. Some patients improve in their ability to name objects seen in the left visual field or felt in the left hand, and it is hard to know if this is a new ability of the right hemisphere or a new cooperation between left and right sides of the brain. I have had the opportunity to examine one patient, for example, who had a brain hemorrhage that injured part of her corpus callosum. When she first recovered she could not name objects placed in the left hand unless she looked at them. Within a few weeks, however, she learned to do this with her left hand—especially if she had been tested before with the same object. Trying to demonstrate this effect of the injury to a group of doctors, I placed, in rapid succession, a pencil, a safety pin, a book of paper matches in her left hand while she sat with her eyes shut. She named them all correctly. I turned to my audience for other test objects and a female medical student provided a lipstick in a metal case. The patient palpated this for a while in her left hand and then said, "No, I don't know what that is." As I smiled at the onlookers she remarked, her eyes still shut, "And I can't understand why a man would have a lipstick in his pocket!"

I have no way of knowing, of course, if this represented the ability of the right hemisphere to talk or a delayed message from the left hemisphere!

The right hemisphere appears to

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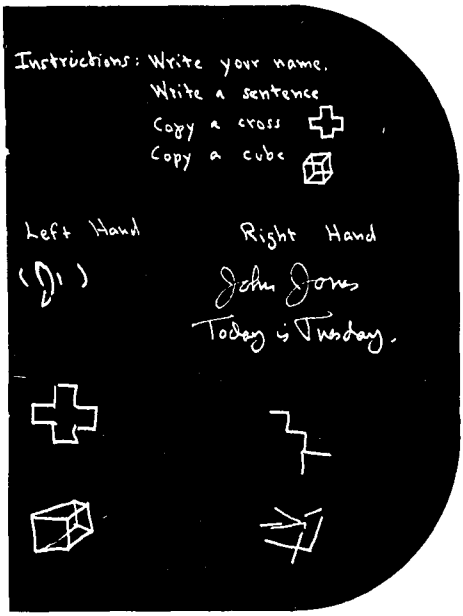

Figure 6. Writing and Drawing by a Split-Brain Patient. The patient is asked to write his name and a brief sentence as well as copy the drawings of a cross and a cube with each hand. Despite the fact that he is right-handed, he could easily do all these things with both hands before his brain operation. After the operation he can write with the right hand, but not copy; and copy with the left hand, but not write.

have greater ability to copy patterns than the left. This can be tested by having the left hand do the copying. (All the patients undergoing section of the corpus callosum in recent years have been right-handed.) It seems unbelievable that the left hand of a split-brain patient can do a good job of copying geometric figures but cannot write a single word. The right hand can write easily but has great difficulty with the figures (Figure 6). Dr. Joseph Bogen, in his analysis of the split-brain patients, refers to this characteristic finding as dysgraphia (difficulty with writing) in the left hand, and dyscopia (difficulty with copying figures) in the right hand.

One of the standardized tests of pattern manipulation is called the Kohs block designs, in which the patient is given a set of wooden blocks painted in two colors and has to assemble them so that the upper surfaces reproduce a pattern shown on a printed card. The patterns range from very simple to extremely difficult. In split-brain patients the left hand (right hemisphere) is much better at this test than the right hand (left hemisphere). What is amazing, however, is to watch a patient struggling with the blocks with his right hand while his left hand keeps creeping out from under the table and trying to help!

Indeed the left hand sometimes displays what can only be called a sense of humor. Split-brain patients complain that when they dress themselves they discover that as they button a garment with the right hand, the left hand comes along behind and unbuttons. The

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lady who identified the lipstick said that she had to be careful washing the dishes because the left hand was in the habit of taking clean dishes and slipping them back into the dishwater to be washed over again. These patients truly have the problem of the right hand not knowing what the left hand is doing!

The studies of these patients demonstrate that the right hemisphere is not a useless "spare," but that it has special important functions. If its sense of humor seems restricted to a crude "practical joke" level, we must remember that, without the cooperation of the left hemisphere, it is speechless.

Let us return for a moment to patients with injuries (usually strokes) to one hemisphere. There is additional evidence for special functions of the right hemisphere to be found in these patients—evidence not yet seen in the split-brain cases. One such function is music. Patients with left hemisphere injury that renders them practically speechless may still be able to sing, particularly if someone sings along with them. (I am not particularly good with this test because my own singing tends to be tuneless—perhaps due to inadequate development of my right hemisphere!) Some aphasic patients can learn new songs, and there is at least one case of a musical composer who had a severe stroke with a bad aphasia who could still compose original music afterwards. Traditionally there is said to be a close relationship between music and mathematics, but if musical ability can be located in the right hemisphere, mathematical ability is almost surely associated with the left. Most aphasic patients have difficulty with writing and arithmetic. There are some who have a relatively isolated difficulty with arithmetic (called acalculia in the jargon of the neurologist). Such patients are found to have injury to the left hemisphere.

In addition to singing, the aphasic patient—with a left hemisphere injury—retains his ability to swear. Indeed, in the absence of any other verbal outlet, and with the frustration of his inability to communicate, he swears excessively, much to the distress of his family and friends. As with singing, the situation must be appropriate. Confronted with a pencil and asked to name it, the aphasic patient may sit speechless for a minute, fingering the pencil and suffering a rising level of tension until he explodes into a stream of perfectly articulated obscenities. In a calmer state, however, he cannot repeat any of these words on command; he has to be "in the mood." My own opinion is that this does not represent any ability of the right hemisphere. Such behavior does not occur during the testing of the split-brain patient, but it is characteristic of diffuse brain injury, involving

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both hemispheres, such as that seen in head injuries, drug overdose, and recovery from failure of the blood supply to the brain. I think it represents an "automatic" if learned, reflex response to pain and anguish and is particularly likely to occur when the cortex on both sides is not functioning properly.

Two Brains—Two Minds?

It is evident that in the split-brain animal, and the split-brain human patient, each hemisphere can carry on learning and reasoning processes entirely independent of the other. Thus the animal can learn two different visual choice problems simultaneously, one with each eye, and the human can point with the left hand to the correct object in a series at the same time that he is denying verbally that he has seen the choice-problem. Split-brain monkeys and split-brain men can be taught to do two different tasks simultaneously, one with each hand, something almost impossible for the normal brain to manage. For this kind of task it seems the split-brain subjects are far superior to the normals. In man the difference between the hemispheres is accentuated because one, the left, is concerned with speech and other symbols and the other, the right, with patterns, relationships and gestalts.

The crucial question is not so much whether the patient who has had his corpus callosum cut has two minds, but whether we all do and the operation merely makes it apparent for the first time. Dr. Bogen, the neurosurgeon, believes that all human minds are dual, that "each of us has two minds in one person." One of these minds he identifies with the left hemisphere—the propositional mind, concerned with syntax, semantics, mathematical logic—the side that speaks, reads and writes. The other mind he calls the appositional mind and identifies this with the right hemisphere. Its functions are, to say the least, obscure, but he suggests that they may include artistic creativity. This is a fascinating hypothesis, but one for which the evidence is still incomplete. That there is a nonverbal, intuitive side to human nature is something we can all observe in ourselves. To prove that this aspect of mind is a function of the right hemisphere would be difficult in the extreme. What the split-brain experiment demonstrates is that the right hemisphere is *capable* of independent thought. This does not prove that it indulges in independent mental activity in the unoperated brain. Under normal circumstances, the two interact, acting in concert, or perhaps occasionally interfering with each other.

Each hemisphere is capable of maintaining full consciousness, intellect and personality. Hemispherectomy, or incomplete removal of one hemisphere, has been performed on a number of patients

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with severe brain injury or brain tumor. All patients were fully alert after the removal of most of the cortex and much of the underlying structures of one entire cerebral hemisphere. All had some loss of motor function of the opposite side, loss of one half of the field of vision and other deficiencies in sensation. Loss of speech occurred in many patients, particularly if the left hemisphere was removed. Personality, however, seemed little disturbed. IQ tests, administered before and after surgery, showed essentially no change. Patients with half a brain had fully normal cerebral function! Better yet, younger patients—and most of these were children with birth injury to one hemisphere—showed remarkable recovery and many regained the ability to walk and talk. Older people did not do so well, and the power of speech, if lost, showed little recovery.

Not only is each hemisphere capable of acting independently, there are methods for dealing with one hemisphere separately without splitting the corpus callosum or performing a hemispherectomy. The technique has been used only on animals and involves injecting some local anesthetic, such as concentrated potassium chloride solution, through needles implanted in the skull, over the cortex of one hemisphere. Rats so treated can learn a maze with the unanesthetized hemisphere. The next day they can be tested after anesthetizing the other half of the brain. The animal then shows no sign of his prior training, and has to learn the maze all over again with the "new" hemisphere.

Application of some similar technique to humans is possible, allowing us to educate each hemisphere independently. Since each half of the brain is capable of full intellectual function, with the possible exception of language, this should result in an individual who could master two careers—one, based in the right hemisphere, would have to be creative and intuitive, such as art or music, the other verbal or mathematical.

One is reminded of Galloway Gallagher, the daffy dipsomanic genius created by the writing team of Kuttner and Moore in the Forties. Gallagher had no scientific education, but his "subconscious mind" had an intuitive grasp of science and mathematics. Following an alcoholic binge, he would awaken to find that the genius side of him had invented some spectacular device, but that he now had no memory of what it was supposed to do. Since Gallagher's intuitive mind had the scientific education, perhaps he was left-handed when he was drunk—the authors don't tell us.

More seriously, if we assume that some harmless method can be devised to produce a "split-brain" preparation temporarily, it might

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be possible to learn two subjects at once, using some modification of Sperry's testing apparatus. In a normal brain the arrival of two sets of information, one from each eye, for example, or one visual and the other auditory, only leads to attention to one set and loss of most of the other. The split-brain monkey can handle this—although Dr. Sperry feels that attention may be more of a unitary character and presents special problems.

A person with an adjustable block of the corpus callosum might be able to finish his education with twice the usual amount of knowledge in his head at no additional expenditure of time. He would probably have to work out a schedule for using the training of the two hemispheres in alternation, unless he could find a position where he did one kind of work with his left hand and another with his right.

I have described how the right hemisphere of the split-brain patient is speechless and contributes little to the individual's everyday life after operation. But we know the right side of the brain can learn, and in children, at least, it is capable of learning to speak, so a useful education is possible.

At the present time, any apparatus that would disconnect the cerebral hemispheres would have to be implanted into the brain. Present technology permits this only by the injection of drugs or the use of electrical fields across the fiber tracts. The major surgery necessary to accomplish this will delay any application until a better method is discovered or some major therapeutic advantage can be seen.

This raises a second question about the disconnected hemispheres. Would this procedure be of any benefit in diseases besides focal epilepsy? I think this brings us back to Dr. Bogen's suggestions that the right hemisphere is a special "mind"—nonverbal, intuitive, creative—perhaps not necessarily logical.

Is this the state of mind that practitioners of the various meditation disciplines strive to reach? Does the right hemisphere convey an awareness of reality that is somehow different? If so, is there some value in bringing it to full consciousness? This possibility

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PLACE	TITLE	AUTHOR	POINTS
1.	Laws and Orders	*Tak Hallus*	2.36
2.	Catalyst Run	*Jesse Miller*	2.60
3.	Owe Me	*John T. Phillifent*	3.43
4.	The Gods' Decision	*Herbie Brennan*	3.72
5.	No Biz Like Show Biz	*Lloyd Biggle, Jr.*	4.03
6.	FTA	*George R.R. Martin*	5.03

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could be investigated if better methods for communicating with the right hemisphere can be devised. Such methods would presumably be useful in the retraining of stroke patients with aphasia. It may turn out that cutting the connections from the left hemisphere is the only way to get into direct communication with the right side of the brain. The left side may "suppress" or inhibit activity of the right cortex.

Some of the characteristics of the right hemisphere are similar to those psychoanalysis ascribes to the unconscious. It is nonverbal, symbolic, illogical and ignores temporal relationships. Emotions, however, are quite typical of either hemisphere. If the right side of the brain is the locus of nonverbalized thoughts, however, it may be the key to some forms of mental illness. Certainly this aspect of the Sperry discoveries has not yet been fully investigated. Would it be possible, by paralyzing the left hemisphere, to communicate directly with the right alone? Would this give the psychotherapist some special advantage? Instruction given to the right half of the brain might show up later, like a posthypnotic suggestion, without the left hemisphere being aware of its existence.

One might think that the split-brain patient would develop a split personality—or a dual personality. To date this has not occurred. There are even rare cases when the corpus callosum does not develop at birth. It is one of the last pathways in the brain to form. Such patients have been examined and do not have any psychopathology except in those unfortunate cases where the absence of the corpus callosum is merely one of the many maldevelopments of the brain. I have met a patient with apparent total lack of the corpus callosum who was, to all routine clinical tests, an entirely normal college student.

There may be other disorders, such as neurosis or schizophrenia, where disconnection of the cerebral hemispheres, or suppression of the dominant hemisphere, could be tried as a therapeutic technique. This would only be feasible if the interruption of the cerebral pathway could be done temporarily, without permanent damage. On the basis of what is now known, however, such a procedure would not be as crippling as frontal lobotomy which has been used for such conditions in the past.

So far, the split-brain technique has only been used in a few special cases of epilepsy. It must be emphasized that it is not a treatment that would be of any use in the more common forms of epileptic seizures. Its potential as a therapy for other conditions has not been explored. New uses for the extraordinary abilities of the human brain may yet be discovered. With differential training, it may be possible

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to put two personalities into every head and double the world's population without depleting its food supply!

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About the Author

Dr. Holmes is a graduate of Stanford and UCLA. At the present time he is an associate professor of clinical neurology at the USC School of Medicine. Though his own research is only peripherally related to the split-brain problem, for more than ten years he has been studying the brain-wave patterns produced by the cat brain. The objectives of some of this research program are described in an article published in Analog in July 1962. ■

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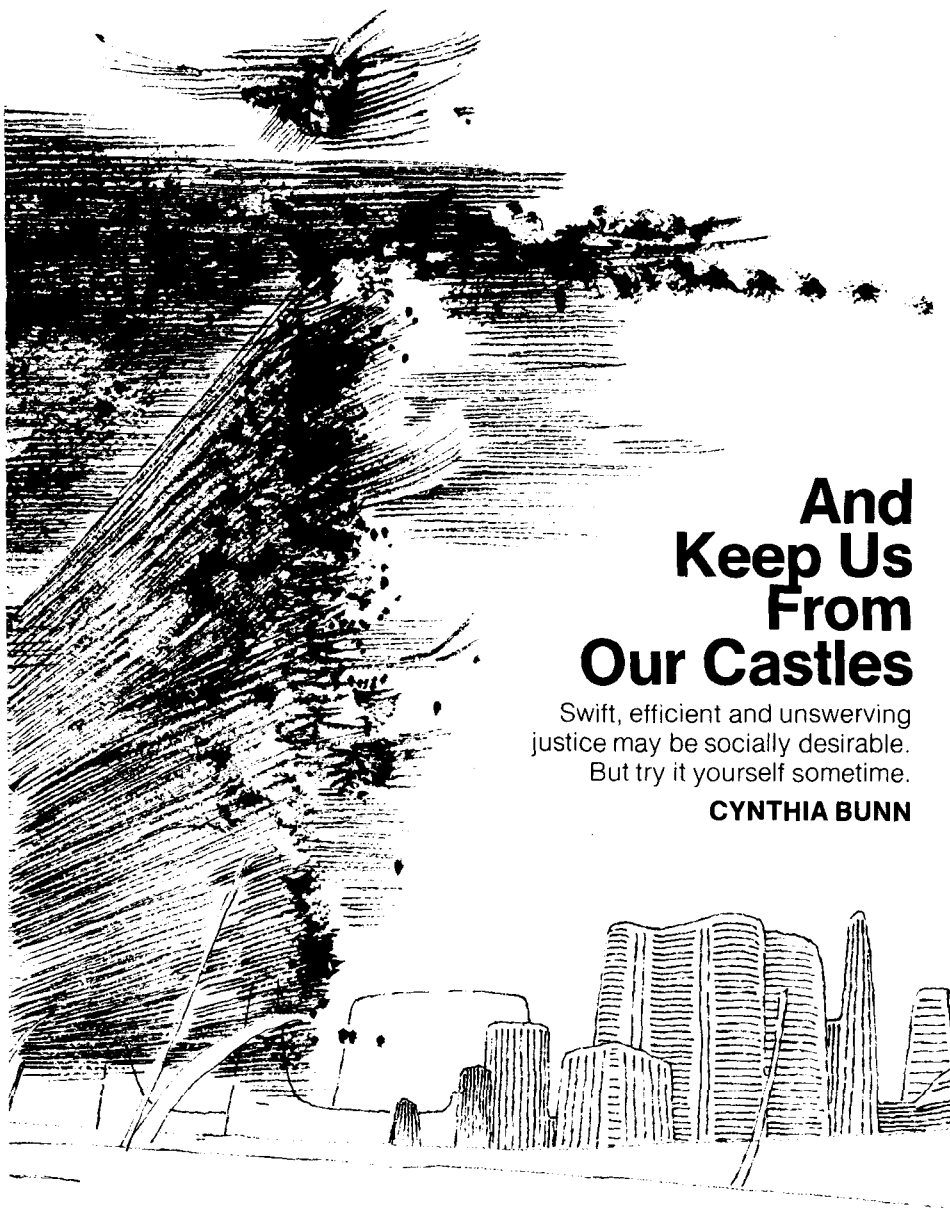

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CYNTHIA BUNN

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He found the farmhouse the seventeenth day out from the city.

It almost went unnoticed, faded to gray-brown among those hills where all—seared grass, trees, ruins of fences and fallen telephone poles—was equally colorless. The collapsing walls were huddled against a ragged hillside, waiting only for one of the frequent tornadoes to bring the final implosion.

Almost missed, but betrayed by the sharp late afternoon shadows of man-made edges. The man who otherwise would have kept walking, along the rim of that hill and others, stumbled down the slope through dry prairie grass, stopping on the stones that had been a porch.

He peered into the dusk of the interior, seeing stray dimmed lightbeams that had somehow passed through the dust-caked windows. Low, broken shapes of furniture. Opened, empty, rusting cans scattered across the floor. There were no sounds but grass rustled by the flight of grasshoppers.

Moving with cautious grace, he stepped inside, left hand already gripping the hilt of his hunting knife. This late in the summer it was unlikely that he would encounter any of the fair-weather backpackers, who always returned to the cities by September. But a few renegades stayed out permanently, dispersed, one or two for every few hundred square kilometers. Cut off from their urban umbilical cord, they obtained their supplies in any way possible, often from a dead man's backpack. And a small fraction of the permanent wanderers were exiled criminals, like himself. Not to be trusted.

There was no one in the room.

It had been inhabited recently, more recently than the layer of rust on the cans indicated. Ashes lay in a rough circle a centimeter deep where someone had been careless or stupid enough to risk a fire inside this shell of rotting wood. The ashes were cold but not yet scattered by the eddies of wind that came through the open door. A week old, if that.

He began to check the rest of the house. The kitchen with its battered, squat stove and refrigerator, mid-Twentieth Century style. Left when the last residents moved away or died. The house was a few decades older than the furniture, probably built more than a century and a half before his uninvited arrival.

He glanced briefly into the mold-covered bathroom, and the dining room where a few pieces remained of the table that had been chopped for kindling. No signs of habitation recent enough to make him wary.

The narrow stairway was sharply canted, and at the top of the landing had half-collapsed; breaking away from the surrounding floor. He kept to the relative security of the top step, which trembled under his feet as he looked around the

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single large dormitory-style room. Remnants of beds were left, frames held together by rusted springs, tottering above dusty fragments of cloth that had been mattresses until they rotted and fell to the floor.

The house was totally deserted. Safe.

Returning to the downstairs floor, he emptied his backpack, the food, cooking utensils, air mattress. These he set in a corner of the living room behind the ruin of a chair. No one looking in would spot them immediately.

This done, he left, with only knife, gun, and the empty backpack to carry whatever he killed for dinner. There was still an hour of daylight left, time to hunt, time to walk the half-kilometer he had to cover to insure his freedom that night.

It was dark before he returned, the still-bleeding carcass of a rabbit wrapped in a plastic bag in his backpack. It was hard to spot game, camouflaged grays and browns in the high, rough grass. This animal had been frightened into bolting and running as he approached. A sure sign that men had left for the cities: the wariness of the small animals was disappearing.

He stared at the ashes on the floor for a few moments, debating the danger of an inside fire versus the possibility of attracting unwelcome company. The door decided his inner argument. Empty, yawning, he could not block it, and even an inside fire would be visible to anyone nearby.

Back outside, with a stack of table legs laced by the dry grass, he roasted the small rabbit. By the time he had finished eating and extinguished the fire the halo was back, shutting off his view of all the stars but those near the horizon, hovering over him, its translucent dark blue now appearing black. Fifteen minutes already, as he'd timed it. It would be good to sleep inside tonight, stealing the remaining hours of peace from the telemachines that constantly pushed him onward, driving him with the halo and three walls, the threat of the final death-bringing fourth wall and floor.

He paused for a moment in the doorway and looked out at the sky again. The halo, which always floated at three meters above ground level, vanished when he stood beneath a lower ceiling. Had he been naive, he would have tried the sanctuary of caves or tunnels, but he knew—as the dead men learned—that the walls, unlike the ceiling, would materialize even if their presence pre-empted stone or earth. He was not the type of man to refuse to benefit from another's mistakes.

Finally he went in, needing sleep more than the unobstructed view of the heavens. He set his watch to let him sleep for seven hours, giving him more than an hour to elude the walls for another twelve-hour

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period. As he set the alarm his mouth twisted into a mockery of a smile. If it failed, he would die. Even a hundred kilometers from the nearest city his life was forfeit to a machine.

He spent more than a week at the farmhouse, leaving the area in the early morning and again each late afternoon, walking until the halo and walls disappeared from around him. The region was peaceful, far enough from the cities that he saw no one, far enough from the jet routes that he was not disturbed by the noise. He'd planned to stay there through the autumn, perhaps even through winter.

His plans ended one afternoon, his tenth day on the northeast Kansas farm, when he returned to the house to see a man sitting outside on the porch. A boy, rather, eighteen or so. With a young and frightened face. But there was nothing of fear in the way the youth held his rifle as he watched the expected returning figure scramble down the hill, finally stopping five meters from the door.

"Are those your things inside?"

He nodded cautiously, forcing his hands to hang loosely at his sides. Another face appeared in the doorway, small, also timid, and after a moment a girl of about sixteen stepped out onto the flagstone porch.

"Get back inside!"

"If this is the man, we have to return his belongings to him. We're sorry, but this was the only shelter within kilometers, and we had to rest."

Yes, she would need rest, he thought, noticing the bulging waistline that even her loose shirt didn't hide. It could be fat—but her arms and face were thin. Pregnant, and with the population controls of the last decade that pregnancy was probably illegal. Especially since she'd chosen to leave the cities at a time when other women were confined to hospitals.

She flushed, aware of his survey of her bulky figure.

"Who are you?" the boy demanded. The gun was beginning to shake.

If he'd wanted, he could have tried to kill the youth. The odds were in his favor. Other criminals would do such a thing, killing the boy and taking the young girl, and the same thought must have occurred to the youth. The gun continued to shake.

"Just a backpacker." A lie that worked at times like this, when he'd just finished a long walk, while he still had more than an hour until the halo materialized.

"You're out here awfully late in the year."

"So are you."

Impasse, broken by the girl saying, "Don't question him. Give him his food and equipment and let him leave."

"Yeah, and let him come back some night."

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"I was going to move on soon, anyway."

"Sure."

He shook his head. "Then don't believe me. You can either kill me or let me leave. Which?"

The girl bolted back inside, emerging seconds later with an armload of his remaining supplies and the mattress. She ran a few steps past the boy, dropped the objects, and rushed back.

"OK," she said. "Take your things and leave."

He looked questioningly at the boy, still aiming the rifle in the general direction of his chest. "Well?"

"Take them."

He replaced the objects in the backpack as quickly as possible, worrying that the time required to deflate the air mattress might keep him there until the halo reappeared. Anything might happen then. After a sweaty twenty minutes he was finished. He pointed at the plastic sack on the ground, containing a freshly-killed pheasant.

"Do you want that?"

"Maybe." The boy removed one hand from the gun, letting the barrel drop, and wiped his palm against his jeans. "Don't you want it?"

"No. I don't need it, anyway." True enough—the area was thick with small game birds and mammals, and he was learning how to hunt them expertly.

"All right." The rifle was pointed at him again. "You want to leave, you said."

He backed away until he reached the foot of the hill, then turned to climb, knowing he wouldn't be shot unless he did something to frighten the youth. He moved carefully, checking each foothold so he would not slip. At the top he kept going, down the other side, not looking back. The crackling of grass and twigs behind him let him know the boy was following.

He continued to move on that autumn, west, north, south, east, walking in any direction, guided only by terrain, the safety of the crumbling roads, and fear of the phantom cell. Whichever way he turned he took a path to keep himself unsheltered by the halo. Occasionally finding himself entering regions he knew to be unsafe, he would turn back, taking a parallel path, but one more than half a kilometer from his earlier steps.

He did not halt now. There were other abandoned houses, shells of buildings scattered across the Midwest, but as the weather cooled even the most ramshackle of these were inhabited by renegades and other criminals. And he had to keep moving if he was to avoid the identifying panel floating above his head, a beacon for predators, betraying him as a man driven to exhaustion, easy prey.

The rivers slowed him. Months at a fast walk took him across hundreds of kilometers, and he crossed

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the Mississippi once and returned, crossed and recrossed the Missouri often. There was a trick to getting across, even after he knew where the ferries were located. He had to time his arrival perfectly, coming to the boat just after a long walk, and hope the ferryman would take him over the river before the cell began to materialize. Ferrymen didn't like

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criminals, even though their predecessors had violated the law to destroy the bridges, below whose shattered frames they monopolized river traffic. He had to pay, of course: dead game, food for the ferryman's often numerous family, the offspring of illegal fertility, the brats and worn women living in shacks at the river's edge.

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The winter's freeze formed ice thick enough to walk across on the smaller streams and lakes, but on the swiftly moving large rivers it was treacherously thin. Worse, the owners of the ferryboats were unwilling to cross during the winter. He was caught on the west side of the Missouri, the empty snow-blanketed plains of the Dakotas and Nebraska and Kansas, which had always been sparsely populated, where the houses were fewer and farther apart than in the more fertile areas of the Midwest. Bleakness where he found no haven from snow or wind.

He learned during the first months of winter to risk his life for a few hours' shelter, staying in one place until the ceiling and three walls formed around him. It was especially effective if he faced the south; the first wall appeared at his back, intended by the government's psychologists to keep him watching nervously over his shoulder. Not planned as a windbreak for a winter backpacker on the plains, but it served. It served.

He kept moving. Once he waited too long, letting the fourth wall join itself to the others, its addition drawing the floating cell down into the drifts, as the originators had planned. He walked blindly for an hour, snow blind as well as caught behind the crystals forming on the wall before him. Walking sightless, timing himself, the ever-louder hum of the watch reminding him that the floor was due very soon. He would be sealed inside a cube of impenetrable plastic and his walk would end. Eternally.

Somehow he made it safely through. He stumbled forward through the remains of drifts broken by the passage of the preceding wall, a blue, cubical, human-powered snowplow on an otherwise empty plain. Just fifteen minutes were left when he passed that unmarked boundary, the walls vanishing to return to their storage rooms, leaving him unprotected in the snowstorm. Whipped and frozen by wind. More grateful than ever before in his life.

December left him emaciated but alive.

January brought hallucinations:

A village, plucked from history or fiction, with no resemblance to the multileveled cities. A small town of narrow streets, low buildings, smiling citizens. He plunged into the village, among the people and through their insubstantial forms, staggering and falling through deep drifts. Colors flickered before his eyes: dead white/brightly painted small homes of turquoise, rose, gold/blinding white/ruddy faces above patchwork costumes/snow. He stumbled past the last side street of the dream town, past the last picket fence, fought the urge to look back, turned and saw swirling drifts. Then tried to hold back the tears, knowing they would only freeze on

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his eyelashes and cheeks. They did.

He saw his family that winter, his son, his wife as she was while alive. Envisioned welcoming arms and fell against icy wetness and black tree branches that hadn't been there a moment before. And once, only once, he viewed her corpse, red-stained before the undertaker treated it, burying wounds in cosmetics, head held in place by wires, not the thin remaining strip of flesh.

Not stopping, never stopping. He lost track of time and place, forgetting which direction he had traveled the previous week, remembering only the direction of that day and the day before. East/west/north/south, reversed, transversed, bound by the Missouri on one side, the Rockies on the other.

Sand dunes welcomed him along a beach as he blundered through the last of January. Beckoning hot sand invited him to shed his clothes, bask in the sun, wade through the shallow warm water near the shore. He ignored it, walked without pausing, knowing the illusory warmth in his feet for the danger it was. That afternoon he found a cattle shed, three tenuous wooden walls and a crumbling roof that no one else had wanted, and he decimated the walls to build a warming fire.

The next day, shadowed by his halo, he moved on. More kilometers, more snow in the harshest of recorded winters, and more mirages.

Crocodiles, once. He saw them watching him, waiting for the tender flesh of his unwary toes. He dodged the hulking long shapes, breaking a wide semicircular path around the fallen telephone poles.

More extreme, improbable hallucinations with the beginning of February. Castles where there were trees. He learned the folly of climbing staircases to tumble off a shattered limb.

Lakes, then. Watery shelters of gleaming Atlantises, tempting him to bury his head in a drift, ending the hopeless flight.

A girl, a very pretty girl, sitting on a tree branch that sagged under her weight, her small booted feet hanging centimeters above the snow . . .

"Hi," the apparition said. "I thought you'd never get here. I've been waiting half an hour."

The first talking mirage he'd encountered. He stared at her blankly, frozen until her laughter shocked him into speech. "What?"

"Sit down," she told him, "before you collapse. You're reacting exactly like every other person I've met out here. Right now you're probably thinking I'm a figment of your imagination."

"No." *Yes*, a fraction of his psyche was screaming, the voice that had led him around crocodiles and up nonexistent staircases.

"You're unusual, then. Good. I

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can always use an exception to the norm. It makes my findings more realistic. Not that they're faked, but they need just those few flaws in behavioral patterns as the polishing touch."

The puckish subself that had convinced him of the reality of other mirages was shrieking again: *Mad, totally mad, you've found a lost maniac, get away!* He took a step, another, away from the girl, now studying him with the same suspicion he had of her.

"What's wrong?"

The words halted him.

"Are you leaving?" Her voice had suddenly gone ragged with fear. *Madwoman.* Trapped between his fracturing mental *Doppelgänger* and a girl who acted too strange, in a place and time when even the most commonplace could be dangerous.

"I don't know—"

"Don't. Please. It's been almost a week since I talked to anyone, except myself." A nervous little laugh. "Six days."

Try it for three weeks, he thought. *Nearly a month without seeing anyone, and find out that solitude is better than the company of someone else who's been affected by loneliness.*

"You don't look like an exile," he said. Outcasts might be healthy and well-dressed during the summer; by midwinter all were worn, wrinkled, grubby. Too clean, this girl.

"I came out here voluntarily." He laughed.

"No. Really. Please, just let me walk with you, whatever direction you're going, I don't care. I'll explain as we walk. I'm frozen. Thought you'd never get here."

He resumed his trek, a straight continuation of the line formed by his earlier footprints.

"East?"

"Does it matter? You said it didn't."

"No, I guess not."

"There's no destination you want to reach?"

She shook her head emphatically. Her long hair—clean hair, in the middle of the plains in the middle of winter—had spilled out of the hood of her jumpsuit, and it clung to the beads of sweat and melted snow on her face, masking her.

"You're just going to follow me?"

"Yes, for a while, if you'll let me. I want to ask you some questions. I need answers only prisoners can give."

His stride broke for a second, a hesitation before he placed the boot firmly on bright snow, unshadowed by the halo he'd eluded an hour earlier.

"How long did you say you'd been waiting for me?"

"Half an hour, maybe, waiting. I spotted you a few hours ago. You were at the bottom of a hill, not much of a hill, though. Lots of trees at the top."

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He nodded, remembering the stand of pine blackening a summit a few hundred meters from his path.

"I was standing in the shelter of the trees. Two days there, waiting for someone to pass within visual range. I was beginning to think it was hopeless, worse than wandering in a haphazard search. I'd almost given up when you walked by."

Good for me. Cheer the man who brought this nut down from her hilltop.

"You had the halo already. You were hurrying. I was going to follow you, run and try to catch up, but I wasn't sure how you'd have reacted."

He had to grin at that possibility. Pursued across the fields by a wild figure in a black jumpsuit. "I'd have run," he admitted. The mildest of understatements.

"That's what I thought. So I ran parallel to you, where I thought you were going, and when I thought I'd be ahead of you, in your path, I stopped."

"On a tree branch."

"Did it really look so odd? It was better than sitting in the snow, and my legs were giving away. I never considered that I might seem even more unreal perched in a tree."

"Like a dryad," he assured her. "North American variety."

"Oh, you're educated! Well-educated! Most people know absolutely nothing about classical mythology these days."

"Most people could care less," he said. *Like me.* "So you waited for me—what would you have done if I hadn't shown up, if I'd turned and taken another path somewhere?"

She shrugged. "I'd have looked for someone else to interview, I guess. That's all I want from you anyway."

As he stared at her, not understanding, she laughed. "No, I'm not after your backpack. Your body, either. Forget that."

"All right." The uneasiness was back, slipping sideways into nausea. He was tired. "Look for some shelter, OK? I need to rest for a few hours."

"Of course."

They found an improbable shelter, a round structure with a pointed roof and walls that were more gaping windows and doors than wall, designed to shield storm-caught picnickers in what had been a park. Its floor was covered with drifted snow, shallowest at the north end where the solid wall had been extended, and there they unrolled the air mattresses and sat down.

Cold. The temperature was only a few degrees below freezing but the winds were strong. Here they were protected from the wind, but shaded, and it seemed even colder than in the gale-torn brightness outside.

After a few moments the girl be-

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gan to rummage through her backpack, finally removing a crumpled package of metal rods which she unfolded into a spindly tripod. Then a mobile of two shallow metal pans, one above the other, separated and suspended from the top of the tripod by fire-blackened chains.

"If we had some wood," she said, "we could heat food." She made no move to stand and he realized she'd been hinting, not very subtly, that he was to do the foraging.

"There's food in my backpack, a rabbit I shot yesterday. I'll carve it up for frying while you gather wood."

She looked at him in disbelief. *Protected,* he thought. *Spoiled. While she's alone she can take care of herself, but now she thinks I'll protect her, hunt for her.*

She was silent for a moment, then struggled to her feet, untangling the long legs she'd folded in a lotus position, and left the building. He watched as she stumbled toward the nearest, scraggly trees, then opened his backpack.

By the time she returned with an armload of branches he had sliced the carcass into thin strips, filling the upper tray of the tripod.

"They're green," she said as she arranged the branches in the bottom pan. "There'll be a lot of smoke, but maybe the wind will blow most of it away from us."

"We can always move."

"Yes." She held her lighter to the stack of twigs, patiently waiting until a few wilted leaves caught fire, then resumed the lotus position on her mattress.

He had a lot of questions he wanted to ask: who she was, what she was doing out on the plains—voluntarily, for Christ's sake. But he held back, waiting for her to offer the answers to unspoken inquiries, more complete answers than could be pried from her.

She was quiet as the meat cooked, sometimes leaning over to add more branches to the fire, coughing occasionally. Most of the smoke rolled past them and up, vanishing past the edge of the roof, but once in a while a gust would blow the smoke toward them. Below the tripod the snow had melted away, revealing a littered concrete floor.

They ate in silence, too. While he gulped the food, she held her portions gingerly, letting it cool before she'd try eating it. *She hasn't been out here very long,* he decided, then, aloud:

"How long have you been out here?"

"Two years, on and off. Does that surprise you? I usually stay out for only a week or two and then go back to the city for a few days' rest and fresh supplies."

"How long this time?"

"A week." She'd finished eating and was rubbing snow on her hands to remove the grease. "My

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copter broke down. I was planning to go further north, to the badlands, but I had to land it here. I couldn't call for help because I never take a radio—the only ones I can buy are two-way, traceable, and I prefer to work without being watched or followed. I always take enough supplies to keep me alive for weeks, in case something goes wrong."

"You must be doing something illegal, if you'd risk being without a radio."

"No. That is, not exactly. Not-approved, I suppose you'd call it. I have a few sympathizers, like the charities that bring you fresh supplies. You must have run into them. That looks like the type of insulated jumpsuit they distribute."

He nodded, remembering . . .

A wildly descending helicopter, following him as it searched for a landing place. He tried to elude it, suspecting at first that it held the sort of sadists who'd chased him once in October, making mad, suicidal dives that kept him pinned against the ground while the halo and three walls surrounded his prone form. They'd left with the appearance of the third wall, allowing him the chance to run and live, perhaps to be pursued another day. So when the black-and-white striped copter found him, that foggy November morning, he ran until exhaustion stopped him.

Two people climbed out, masked by smoky face shields, formless in bulky jumpsuits. He watched their approach with cornered, deadened weariness, holding his small handgun. Waiting for them to get within a range where he could shoot them accurately.

They stopped fifty meters from him, just as he raised his right arm and aimed the gun. A third figure emerged from the copter, dragging large boxes across the field to where his/her two companions had halted. They conferred for a moment, or he guessed they were talking as they looked at each other, though he could neither hear them nor see their faces. Then they returned to the copter, without coming closer or calling to him, although he couldn't be sure of that either. The gusting wind would have blown away even the loudest shout.

After their copter was gone he approached the packages cautiously, aware of the possibility of concealed bombs, but when he risked opening the boxes he found supplies. Food. Four winter jumpsuits, one of which fit him. A recent newsmagazine, published in Denver, as though they thought he wanted news of the world that had evicted him permanently. Another air mattress. Many items of camping equipment, light enough for a backpack. Items he didn't need spares of, since he couldn't carry the extra weight. He left all but the food and jumpsuit . . .

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"At the time I left the cities, the charities that helped prisoners were being uncovered and publicized. It was very unfavorable publicity. I didn't think they'd last much longer."

"Most of the members have had to give it up under social pressure. All that's left of the Denver organization, I've heard, is the staff, and even that's been reduced."

"That's where you're from?"

"Yes."

He told her about the people who'd brought supplies to him; the Denver magazine.

"Were you one of them?" he asked.

"No. I don't know who they were, either. I contributed money to the charities, but I never found out where their headquarters were located. No one did. And if any of my friends worked actively to help the exiled criminals, they kept it a secret."

"If you're not working with them, why are you out here?"

"I'm a psychologist. Don't look at me that way! I don't work for the government. And I'm not affiliated with an institute, either. I'm free-lancing, researching independently, trying to gather information to prove the inhumanity and stupidity of this particular type of punishment. I won't be able to publish my findings for a while, but I plan to stay in the cities after another year, work for an institute, and maybe after I've established a reputation I can publish unorthodox theses."

"That would be years from now."

"Five or six years, at the least."

"You won't be helping those who are out here now. Do you expect them to live until your thesis is finished?"

"No. They'll be dead by then. As you will be, long before that time. I'm not certain I'll be able to speak out, and even if I can it's doubtful that public opinion can be altered. The odds are against any reform coming. But I'm trying anyway, because there's still a small chance that ten years from now the sentenced criminals exiled from the cities will be allowed to wander freely. Without that halo you'll be under in a few minutes."

He glanced down at his watch. They'd been in the shelter an hour and a half. "Five minutes left, I estimate. If you're not one of those people who are frightened by the sight of cells, I'll stay here until the third wall arrives."

"No, I don't mind. The first time I saw a man walking with that cell hanging over him, it upset me. I've adjusted."

"Not everybody can. There are more than a few psychotics out here, men who still scream and panic every time the ceiling appears. They don't last very long."

"How many weeks have you been out?"

"Six months."

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"Oh, no. No prisoner I've ever heard of lasts that long."

"Good. That makes me even more of an exception for your survey, doesn't it?"

She flushed at his sarcasm. "You're just like all the others with your resentment of me."

"Why shouldn't I resent you? You want to use me as a statistic, reduce me to a number or a letter or a percentage—I prefer a letter. Exile D thought such-and-such of his sentence. That would be better than appearing as a percentage, say one man out of sixty-six, if you can locate that many to help you with your madness. Then I'd be the anonymous one-point-five percent that believe—"

"Shut up!"

"Why does that bother you? Haven't you found that many exiles yet? That would make me even more significant. Five percent? Ten?"

"More like one tenth of one percent."

"That many? What a shame. In that case I hope I'm exceptional enough to qualify as a letter."

"Stop mocking me!"

"All right. Go on with this important interview. First question?"

She glared at him, started to speak, but clamped her mouth shut. Again she searched through her backpack, this time pulling out a notebook and pen.

"Primitive. Don't you have a recorder?"

"I left it in the copter. There's too much chance of it breaking down, and I'd have to walk all the way back to the city to get it repaired. This is slower but more practical."

"Practicality is the one characteristic I'd never expect of you."

"Did anyone ever tell you how sarcastic you are?"

"My wife, sometimes."

"I'll bet she was glad to see you go."

"She's dead."

"Oh. Is that—no, I'll get to that question later. First, I need your name. Don't worry, it won't be in my paper to embarrass any living relatives."

"Hedrick. Raymond Hedrick."

"Age?"

"Thirty-four."

"Marital—never mind. Family?"

The interview—which she'd said was only preliminary, background questioning—took more than an hour. He answered questions about his childhood and parents, his wife and son. Religion: agnostic. Education: MA in computer science.

"Typical," she'd said.

"Why? Typical for a criminal, you mean?"

She'd smiled and shrugged. "Income per year?"

He was irritated. She was showing the all-too-common snobbery of social scientists who believed their professions superior to physical science. He didn't voice his an-

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ger because too many physical scientists were equally aloof and condescending.

There were more questions about his pre-crime background, and then he began to relive the near past for her, describing how he learned of his wife's death.

"The police?"

"Yes. I got their message that afternoon at work. Her body had already been prepared for burial, but they had pictures of her, taken when they found her on the bedroom floor. I was held for two hours while they tested my physiological reactions to the photographs and their questions."

"Guilty until proven innocent. Happens all the time. You're not that much of an exception. So they let you go overnight, ran you through a trial the next morning, sent you to the clinic for the implant operation, and then released you outside the city."

"Not quite. I killed a man first."

Her fingers slipped on the pen, dropping it but catching it before it could roll off the notebook. In the seconds before she looked up again, she managed to freeze her face into a calm mask. *Admirable self-control,* he admitted inwardly.

"I thought you said you weren't a murderer."

"I don't consider killing that man a crime. Revenge, maybe. I knew who'd killed my wife, one of my neighbors, due to undergo treatment as a child-molester. My wife had seen him with our son one afternoon and reported him. That must have pushed him the final step into psychosis."

She was writing rapidly, making the small neat symbols of shorthand. Frowning. "I'm sorry about what I said earlier. You're not at all typical. So you killed the man, and the police caught you . . ."

"I turned myself in."

She scratched through a line. "Did they drop the charge of murdering your wife?"

"No."

"Any idea why not?"

He shrugged.

"All right. Tried and convicted on two counts of murder. How long did it take the jury to decide?"

"A few minutes."

She stared at him, then said, "No offense, but are you lying to me? This sounds more unusual with every answer."

"I can't help that, though I have to admit that I was surprised, too. I had a good attorney, and I thought he gave a brilliant defense. The emphasis was on my 'emotional disturbance', as he called it. He was trying to obtain psychiatric treatment for me, rather than exile."

"Do you realize how few cases like that fail? Less than five percent, since the psychiatric program has proven so successful."

"I know."

"Tell me about the jury."

"They were like all other jurors.

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Most of them were in their thirties, I suppose. A few more men than women."

"Hmm. Typical jurors . . . You know, there is one theory that might explain your sentence, about how average people, the type that pride themselves on their normality, react most righteously to any trespasses by others of the same mold . . ."

"Go on."

"Never mind. It's not very well substantiated, anyway. OK, the operation."

He reached up self-consciously to touch the scar tissue, now hidden by long hair. Just the barest discernible lump. The tiny implant nicknamed "Telltale," the wandering companion of the telemachines. "What about the operation?"

"The time."

"That afternoon, three hours after the trial."

She closed the notebook after a few more scribbled lines, replaced it in her backpack. "Enough interviewing for today."

But not the end of interviewing for that week. Or the next.

Her curiosity was insatiable. She carried five thick notebooks in her backpack, and by the end of the second week all but one were filled with cramped symbols. She asked ever more general questions and requested ever more elaborate answers, delineating with her hieroglyphs the skeleton of his view of society and self, fleshing the bones as he talked for hours. Monologues on his work, his opinion of life in the city, the people who'd surrounded him. Most often, his punishment.

"You've already told me that you paid little attention to the introduction of the mobile cells four years ago," she said one day after several frowning moments spent perusing her notes. "Yet you've never referred to seeing a demonstration of the cells, and statistics indicate that all but an insignificant fraction of one percent of adults viewed such demonstrations, either broadcasts or live. Didn't you?"

I attended one of the demonstrations in an auditorium on my level."

His wife had gone with him. They could have watched the broadcast exhibitions, but were bored and preferred to go out.

Other couples and singles must have thought along the same lines. The auditorium was crowded, and they were routed to the balcony. It had just been opened for the overflow but was filling rapidly. They managed to get seats in the front row, along the railing, looking down on the small, square, empty temporary platform.

Half an hour later no more seats were left and the doors of the auditorium were locked. A man clutching a microphone climbed onto the platform and stood in its

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center. His straight-cut gray tunic and pants identified him as a government representative; his face was pale and cold. Obviously his natural habitat was the world of gray metal desks, filing cabinets, and squat office machines. He was nervously out of place in a citizen's auditorium.

He began to speak, explaining that he had willingly undergone the implantation of a Telltale, the miniaturized broadcaster which always betrayed his location to the computers of the telemachine complex. If the data received indicated he had stayed in one area for too long a time—a half-kilometer diameter/two-hour limit for criminals, fifty meters/three minutes for him—the six cell walls would be automatically transported at equal intervals. The panels, three-by-three-meter squares, could be cut only by diamond-edged tools or lasers, neither of which criminals were likely to find outside the cities. (He paused for a moment as several in the audience laughed.)

In the few remaining seconds before the cell began to materialize, the official explained that this particular castle would disappear within a minute after it had completely formed. Hedrick thought he could detect a trace of fear in the man's voice, but before he was certain the ceiling appeared—halo, as it had been nicknamed, because it identified criminals as surely as the mythical golden circlets hovered above saints. The man had stopped speaking and stood motionless with only a few upward glances. His face looked even paler, but Hedrick had to concede that the light filtering through the halo could produce that effect.

Minutes slipped past, and throughout the auditorium people shifted restlessly. Three walls, then the fourth, and through the blue plastic surrounding him the government representative was a dim, barely visible figure. Still standing straight. His features could no longer be distinguished.

Then the floor panel, displacing the platform surface for an instant before it rose and lifted the trapped man. Sealed to the walls, a barely visible seam above its two centimeters of thickness. For a moment the man inside kept his composure, then his legs folded and he crumpled to the floor. When the cell vanished—in less than a minute, as promised—he was helped off the platform and out the back exit.

The doors of the auditorium were unlocked and the audience filed out, all talking at once about the strangeness of the official's behavior.

He finished his description of the demonstration, looked away from the snowdrift he'd fixed his gaze on, and saw that the girl was shaking her head. "I wasn't very impressed," he said. "Perhaps I

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should have been. Lind, you act as though you don't approve of my reaction."

"Poor man. The official you saw was claustrophobic, a screaming neurotic. Perfectly ordinary except for that one flaw. He offended his superiors in some way, and to punish him they had him demonstrate the castles, thinking that would be an effective way of frightening potential criminals. They were mistaken. The public interpreted his overreaction as a poor job of acting, and the demonstrations had little effect."

"The cells never have appeared very threatening to anyone outside them, and since they're only used on exiles, people in the cities can forget about them. Having the press label them 'castles' didn't help either."

"What did you think of the use of the word 'castle' when it originated?"

"I didn't think about it. Some of my friends considered it a clever play on words, though."

She was shaking her head again. "That's what the government discovered was the general attitude. So last year—after you left the city—they gave up trying to intimidate the public and started using a few spare castles to frighten juvenile criminals."

"What?"

"Really. Psychologists objected, petitions were circulated, but some bureaucrat with a long title thought it would be good to let the kids in juvenile homes spend a night or two in the castles. Sort of a modern bogeyman. The way it turned out—"

"I can guess that it backfired."

"Completely. The children rioted, parents filed law suits, citizen committees were formed, et cetera. The genius who'd planned the program lost his position. But now they have a study group trying to think up uses for the cells that aren't needed for sentenced criminals. The telemachines are too expensive to be left lying idle."

"Wasn't thriftiness one of the party's campaign platforms?"

"Yes, but so was intelligent leadership."

After two weeks in the wilderness that had been a park they had to move on. His constant hunting had thinned the animal population, the tracks he left warning off the more cautious creatures.

Lind didn't want to stay with him.

"I have all the information I can incorporate into a thesis. Too much material, in fact. Most of what I've transcribed will be superfluous data."

"Then why the hell did you ask so many questions?"

She looked uncomfortable and pretended to be absorbed in repacking her backpack. Finally: "You're the most intelligent prisoner I've met so far. Commu-

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nicative. What you've given me is a very personal insight into how a condemned man feels."

He snorted.

"I mean it. What I have now is a record of your life, your trial and out-city wandering. It will be very valuable, even though there won't be room in any thesis for all the details. But you've given me a better perspective, something I couldn't get with the standard brief interview. I feel an empathy with your life."

"What about my death?"

The question startled her for a moment, then came the usual swift recovery. "I feel sympathy. I know that sounds cold, but I am sorry that your death is inevitably close. I hope you have some months left."

"You should stay with me. Yes. *Really*, as you say so often. Unless you witness my death, that empathy you value will be incomplete."

"Don't be ridiculous! There's no way to judge how long you'll be out here, unless you plan to commit suicide by waiting for the castle just so I can witness—"

"No. No way."

"All right, then. I have to use my time to interview other men."

"What did you say that first day? That you've already interviewed hundreds of exiles. You know as well as I that you have enough of a sample. Eight hundred or a thousand, it will make little difference to the people who'll read your thesis. What will matter is how you view the data."

She laughed weakly. "Are you certain you never studied psychology? Or maybe law. This is turning into an interrogation."

"Well?"

"I'll run out of supplies if I stay out here."

"I finished the last of my packaged food months ago, but I've managed to get by on meat and whatever I can gather from orchards and fields. You can do the same."

"This jumpsuit will be too heavy to wear this spring and summer."

"The inner layer can be ripped out."

"I have friends! They'll worry."

He stared at her skeptically until she said, "OK, so they won't panic. They're used to my not contacting them for months at a time."

"Any more excuses?"

"One. I have just one notebook left."

"How much paper do you need to record empathy?"

She didn't answer. They finished packing and left the park, slipping in the mud and slush of the first spring thaw.

By mid-March they had established an easy relationship. Not sexual—he had propositioned her once and she'd refused, saying she didn't want that final involvement with a man who carried his death sentence over his head. He never

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asked again, partly because he respected her decision, but also because the months alone on the plains had accustomed him to celibacy.

They stopped infrequently now, only for a few hours at a time to let him rest. Despite the easiness of hunting, he was losing weight and the jumpsuit that had fitted in November was loose and awkward. She assured him that the suits were cheaply made and often stretched, but he saw the expression in her eyes and knew she didn't believe her own lie. He was weakening and the halo was often above them. She shivered beneath it but did not leave his side. Sometimes he would spend an hour jogging, escaping the ceiling, but the exertion demanded that he rest later while even the walls materialized. At those times, seeing him partially enclosed by the castle, she would move away, and the fear would not leave her face until he'd walked so far that the cell disappeared.

Southeast, that month. She'd never been that far east, confining her survey to the plains west of the Missouri, so he took her across that river, through Iowa and northern Missouri. With state governments abolished the names no longer signified anything, but she took an intense interest in the ruins and border signs. *History-oriented,* he thought. *Common in a society that prefers to keep attention away from the present.*

Across the Mississippi and back, over and back again because the flowing water fascinated this girl who'd known only still indoor pools. Each time she attracted the stares of ferrymen. Hedrick suspected that, even without recognizing him as an exile, they'd have liked to push him into the river and keep Lind. He watched them carefully.

By April they were wandering west again. He'd suggested going south, through the former states of Arkansas and Texas, but she'd objected. Too many people had rejected the cities in that region, she'd said. So they returned to the plains.

The first three weeks of April were unusually dry, even for that area of the country. The land was hard, easy to walk across, no hampering mud—yet he began to falter. Tripping and stumbling frequently, barely a stick figure inside the suit. His digestion was no longer good and some days he refused food to avoid the sickness that followed.

West. Farther west. With each kilometer they were closer to Denver and the medicine she'd promised to bring him, keeping him alive as long as possible.

He collapsed repeatedly as they walked across the flatness of eastern Colorado. The hallucinations were back, and in his most delirious moments he tried to attack her, seeing her as a spirit of death trailing him. And he was not ready to

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die yet. When he was rational he walked calmly, saying nothing, and she did not interrupt his silence.

Above them floated his ever-present, waiting halo.

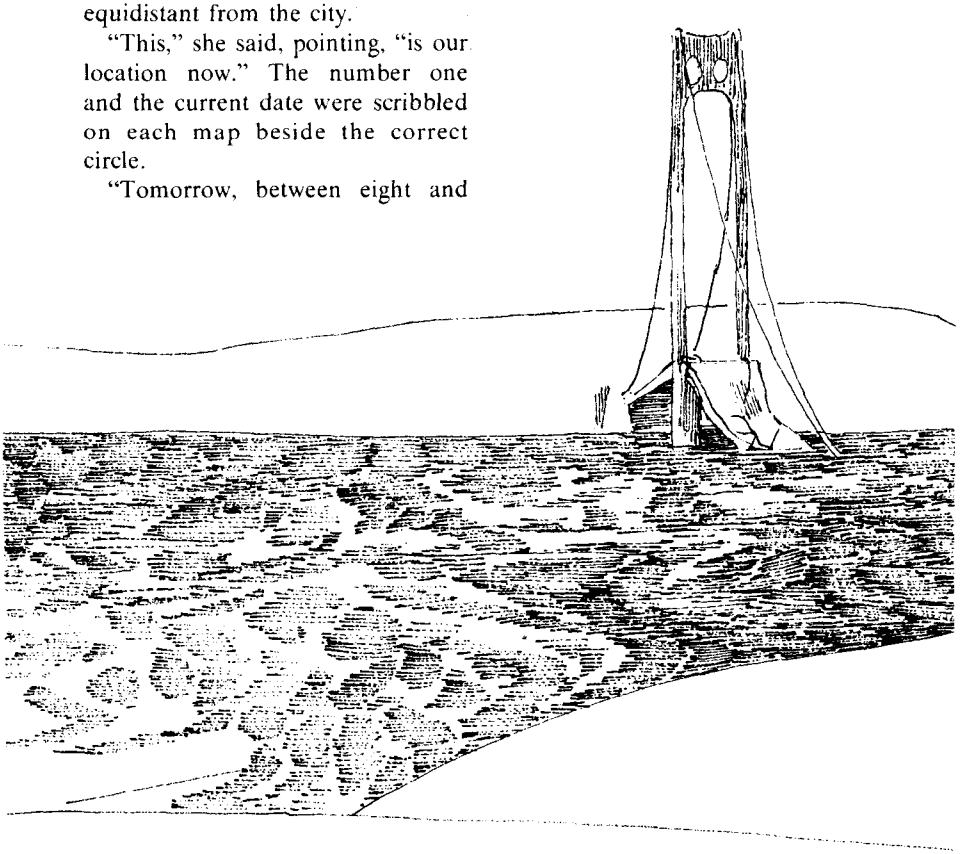
They rested for a few hours when they were still kilometers from the walls of Denver. She used the time to mark their maps, his worn old one, hers that was barely less crumpled and stained. Red circles. She drew tiny red circles, seven of them, equally far apart, equidistant from the city.

"This," she said, pointing, "is our location now." The number one and the current date were scribbled on each map beside the correct circle.

"Tomorrow, between eight and nine a.m." She marked a second circle. April twenty-third.

And continued marking, each circle numbered to indicate to him where she would meet him and when. And, in case his weakness made him lose count of the passing days, each circle with a date. His watch had miraculously kept running. If nothing else, it would let him know which location he should arrive at each morning.

"Before you go—"



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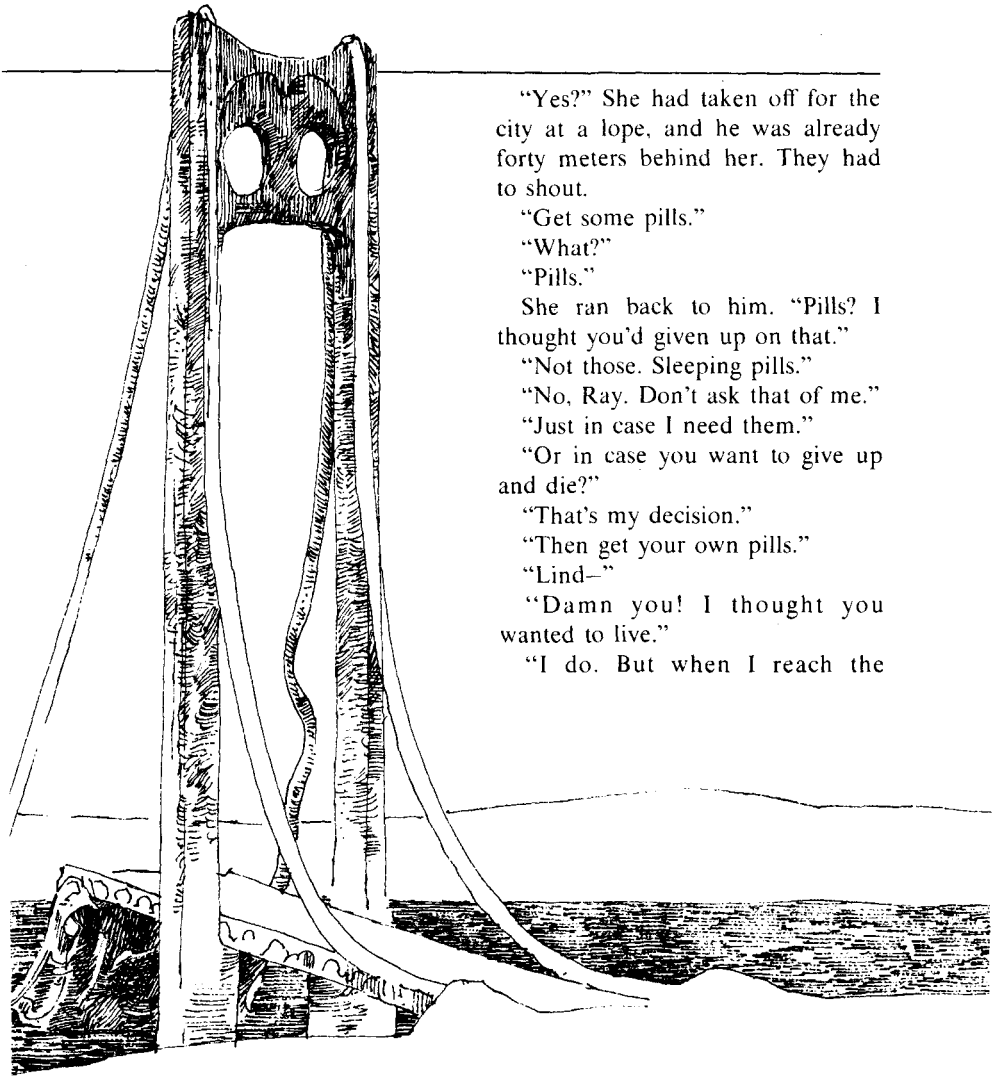


"Yes?" She had taken off for the city at a lope, and he was already forty meters behind her. They had to shout.

"Get some pills."

"What?"

"Pills."

She ran back to him. "Pills? I thought you'd given up on that."

"Not those. Sleeping pills."

"No, Ray. Don't ask that of me."

"Just in case I need them."

"Or in case you want to give up and die?"

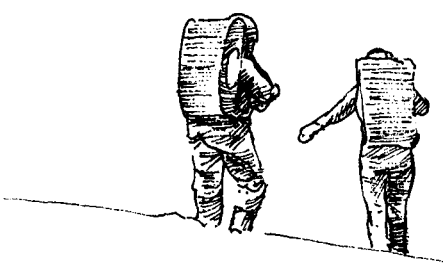
"That's my decision."

"Then get your own pills."

"Lind—"

"Damn you! I thought you wanted to live."

"I do. But when I reach the



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point where I can't run any more, I want to die decently, not of anoxia. Not in madness."

She stared at him, wild and unhappy, then turned to run toward Denver.

He got to his feet slowly. It was a warm spring, too warm, despite the shade provided by the halo. The next circle, less than a centimeter away on the map, was fifteen kilometers distant. As fast as possible, he walked toward it.

She was not there the next morning. He waited the full hour, another half hour, fifteen minutes more. Sipped from the canteen, rested, and waited. At nine-fifty he left.

April twenty-fourth. The third circle. She did not come.

Neither did he see her on the twenty-fifth or twenty-sixth. The fifteen kilometers between meeting points were getting longer. He did not eat during those days, his stomach could not tolerate food. It was psychosomatic, he repeated to himself, the result of the square death-shadow hounding him. But the mental assurances did no good, and the acid pain in his belly continued.

The evening of April twenty-sixth caught him far from shelter in one of the sudden hailstorms of the plains. He sat through it, head bent forward as he stared at the ground while hailstones pummeled and bruised his back. Later he found it difficult to stand and straighten his spine, but he kept going across the land, arriving only twenty minutes late at the sixth meeting point. And waited, knowing Lind was not the type of person to arrive on time and leave in anger or desperation because he wasn't there promptly.

Optimism supported that waiting. It near-died as he consulted the map again, checking the location of the one remaining circle. "If I don't come out within a week," she'd told him, "don't wait for me. Assume something happened to keep me in the city."

After six days he was certain something had happened: her own decision to stay. She hadn't wanted to remain with him two months earlier. She didn't want to watch him die. Now she had returned to a normal life, studies, research, writing, probably trying to wipe out memories of him. He hoped—sincerely hoped—she would succeed.

Eternal optimist. He had disdained the common escape of suicide, chosen by so many sentenced criminals within hours of the trial. He'd lived longer than the others, walked farther, clung to life as though he didn't know he'd already lost it, forfeited to six plastic walls. He continued his circular path around Denver.

The last day of the allotted week. He no longer expected to see her, had already planned to leave exactly at nine, walking and running until he fell permanently and the cell enclosed him. He waited

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impatiently, wishing the hour at an end.

At ten minutes of nine he saw her running toward him. Stumbling but never falling, not slowing until she reached him. Arms flung around him.

"I didn't think you'd be here," she gasped, pulling away to stare at his burned face.

"Why not?"

"I didn't think you'd wait for me. I wasn't even sure you'd still be alive." She slipped her pack from her shoulders—a different pack, he noticed, than the one she'd carried into the city. Different clothes: a short summer tunic instead of the tattered, grimy jumpsuit she'd worn for two months.

"I have some medicine. Enzymes, so you can eat again. Tranquilizers and stimulants in case you ever want them. Vitamins and protein supplements a doctor said might help you." Food and supplies were tumbled onto the grass as she searched.

"Wait." She looked up at him. "Did you get any barbiturates?"

"You don't need those." She went back to her search.

"Lind, I don't have time to see if your vitamins and protein work. I won't make it that far. The halo's here already, and the first wall will arrive very soon."

"You'll have a few hours to recuperate before we leave."

"No. I won't be able to move that fast. I couldn't even stop to sleep last night. I needed every hour to get here in time. And I was afraid I might not wake up, even with the alarm. Lind, I want those sleeping pills."

"No!"

She stepped away, but he had grabbed one shoulder strap of the backpack. Weak as he was, his strength still matched hers.

"Didn't you get them?"

She let go abruptly. He was sitting Indian-fashion, and the release of tension sent him rolling back on the grass. "Yes, I got them," she said bitterly. "They're at the very bottom of the pack."

He turned the backpack upside down and checked the labels on two other bottles before he found them. "Were they difficult to get?"

She shrugged, looking away, back at the city that was only a hazy shadow on the horizon.

"All right, don't answer me." He opened the bottle, poured several of the pills into his left palm, then back into the bottle. "How long do these need to take effect?"

"A quarter of an hour."

"That long . . . well, I don't need to take them yet. Maybe an hour after the third wall arrives. Are you crying?"

"No. The sunlight hurts my eyes after a week inside."

"I'm not surprised." More gently: "How was the city?"

"The same." She stared west, at its high walls. "Nothing important has changed, except for the fact

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that *The Atheist Weekly* is no longer published."

"What happened? It was doing very well." Better than the other newsmagazines, he knew. Atheists outnumbered the supporters of any single religion, and most atheists and many agnostics subscribed.

"They printed something that was just a bit too political."

"They've always been politically oriented."

"They've always published satire of the established churches, too, but they combined the two interests and found they'd annoyed quite a few influential people. One of their editors wrote a parody of the Lord's Prayer—you know, Christian?" He nodded. His parents had been Reformed Buddhists and he was a professed skeptic, but he'd studied the more important religions. "Anyway, they converted it into a protest of the use of castles to punish criminals. It seems their humanistic creed demands that men be treated better than caged animals. So—"

"'Our leaders, who art in Washington'?"

"Close. Very close." She frowned, concentrating.

"'Our father, who art in Washington,

Hallowed be thy mandate.

Thy electorate come, thy will be done

Here as well as abroad.

Give us this day our daily welfare,

And keep us from our castles,

As we keep those who commit crimes against us.'"

"Isn't there supposed to be an 'amen' tagged onto the end of those prayers?"

"I don't know. I'm not Christian."

"So the government simply rescinded their publishing license."

"And fined them into bankruptcy. And the editors were exiled. The other magazines are very dull reading now."

"I'm surprised there were any sleeping pills left. They'd be very popular."

"You'd be more surprised to see how many citizens have forgotten that *The Atheist Weekly* ever existed. No one mentions it."

"How'd you find out what happened?"

"Psychologists—my colleagues in particular—have longer memories and more stringent consciences than other people."

"Not to mention more vanity. I'd like to hear about the rest of your visit."

She checked her watch and stood up. "Not now. I'm going for a walk."

"You'll miss out on a lot of empathy if you don't watch me die." The attempt to keep his voice light failed.

"You have six hours before the last wall arrives. I'll be back by then." And she left, walking steadily, with occasional glances over

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her shoulder to confirm that he was watching her. Finally out of sight, she began to run.

Flight. Mad running: purging, cleansing, seeking forgetfulness in exhaustion. Amnesia in pain of falling and bruising. Catharsis in staggering on while her lungs burned, one wooden leg after the other, remembrances of past journeys.

Farthest point, and return. Just as far to go, the same amount of time, and less energy. Much less. Finding new limits of endurance. Five hours past and more kilometers to go. Eyes watering, tears and pain of wind striking the face, running with the last reserve of energy.

Six hours.

"Christ, you actually came back."

Collapse on hands and knees on warm afternoon earth.

"I didn't think you'd get back in time."

Exhausted nods, answered by a smile from the sunburned scarecrow now sheltered by three walls and the ceiling, his skin purple in the light filtering through the incomplete castle.

"I was lonely without you. That's not a lie. I know why you left. It's cruel of me to ask you to stay here while I die, but I'm a social animal." A shrug behind that statement. "I need company."

"Perhaps," she gasped, "I should have brought others, many others, mourners of your death."

He smiled again, a beatific smile, balancing the bottle of sleeping pills on the upturned palm of his right hand. His earthly salvation and heavenly resurrection. "You're sufficient, Lind. One honest mourner is better than fifty insincere. I only wish we'd been lovers."

She shook her head.

"No, I'm not asking you now. But it would have been a good relationship." He opened the bottle, poured out a palmful of barbiturates, swallowed them with a few sips from his canteen. "Fifteen minutes. If it was thirty I might attack you. I've wanted you all this time."

"You know why I refused."

"Yes. I only regret my morality, which let me respect you. Fourteen and one half . . . did you have a nice walk?"

"No."

"I see you're bleeding. You should return to Denver after I die and have those cuts treated. Meanwhile you may as well use my medikit." He tossed it so that it landed near her. "There's no point in letting those cuts get infected."

She opened the kit and daubed antiseptic on her wounds. "What did you do while I was gone?"

"Thirteen . . . I reviewed my conscience and tried to repent past sins. Just in case whatever god might exist favors the religious. I still feel no regret for killing the psychotic who murdered my wife."

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"You don't think you should have let the courts punish him?" Idiotic conversation, but what else could she say: Why don't we discuss your final dying opinion of the world?

"No," he said flatly. "They might have just sent him in for psychiatric treatment earlier. He didn't deserve to live, even with an altered mind."

She shook her head, silent, concentrating on the pain of antiseptic against raw flesh.

"Eleven minutes. I almost decided not to wait for you before taking the pills. I didn't think you would return."

"I didn't want to," she mumbled.

"What?"

She repeated, and he looked smug and said, "I was right after all. I'm feeling high. You didn't mention that effect. I expected only drowsiness." He looked at his watch again, his left wrist wavering as he tried to hold it steady. "Damn. Nine and a half minutes. Is that what you have? Good. I don't trust this watch after so long, and I can hardly read it. How long until the fourth wall arrives? I'm in no shape to calculate the remaining time."

"Thirty-seven minutes," she answered. He was looking in her general direction, but his eyes weren't focusing on her. Or on anything.

"I won't be awake then. Thirty-seven minutes, then two hours until the floor arrives. Forty-eight hours until the pick-up crew comes to get my decomposing body. Why do you suppose they leave these ugly cubes of plastic out here so long?"

She shrugged helplessly.

"God, you're quiet." He swallowed more pills, emptying the bottle to the half-full mark.

"That's all you need." She stepped toward him, reaching out to take the bottle, but he pulled it away, clasping it against his shallow chest. She stopped where the shadow of the castle touched the ground.

"Why?"

"The doctor said that just half would kill you. That's all you have to take."

"You mean you asked him how many pills were required to commit suicide?"

She shook her head. "No. He told me what quantity constituted a fatal overdose."

"So?"

"You don't need the rest."

He grinned wildly, continuing to empty the bottle and gulp pills. Between mouthfuls he said, "So I'll take an over-overdose. Overkill on an individual scale. That's fashionable, isn't it?"

Three-fourths of the bottle gone.

"I guess so," she said.

"I just want to be certain," he told her. "I don't want to wake up again, shut inside the castle, halfway between life and death. Five minutes. No, four. I have trouble focusing." He chuckled. "Christ, I

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can't see. Four minutes. Is that right?"

"Yes." The bottle was empty.

"You could at least give it more emotion. Empathy, woman. I'm dying. Me, the only man with this genetic pattern, anywhere, anywhen. The end of an individual . . .

"Where's the chorus? I need only one official mourner—you're appointed—but no music? No recognition of my passing? Am I going to die as anonymously as I was tried? You've read the court records, Lind. An accused eight-digit number sentenced to a three-digit punishment . . . three minutes.

"No tragedy now, just numbers. Stop crying, damn it, you're disturbing my thoughts. Cry later. No *Weltangst* anymore. Private, unnoticed pain, anonymous misery. You can't construct tragedies from anonymous suffering . . . two minutes.

"This is not a world for Hamlets and Macbeths, Lind. Or even Butch Cassidys—no, that was long before your time, a story told by my grandfather. No ultimates. No perfect fulfillment. No Tristan and Isolde . . . you were not my lover, yet ideally you should lie . . ."

His voice died in sleep.

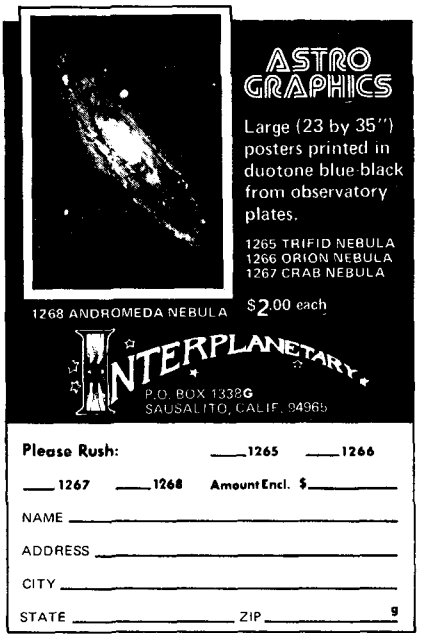
She watched the prone figure, open-mouthed, emaciated, undignified.

The fourth wall came as a separation. Blue and glassy, and behind it the figure of a man lying in stillness and the inertia of death. She looked wistfully at the emptied bottle of sleeping pills.

The floor arrived finally, waited for in light and shadow, appearing as the bare two centimeters. She knew that with its materialization went the signal to the pick-up squad. There was no longer any need for her to wait.

She left, with only one short glance at the blue translucence of the halo over her head, courtesy of a government that did not like to underuse its telemachines. The same government that disliked public sympathy for exiled criminals.

If she hurried, she would be out of the area before the first wall could appear. ■



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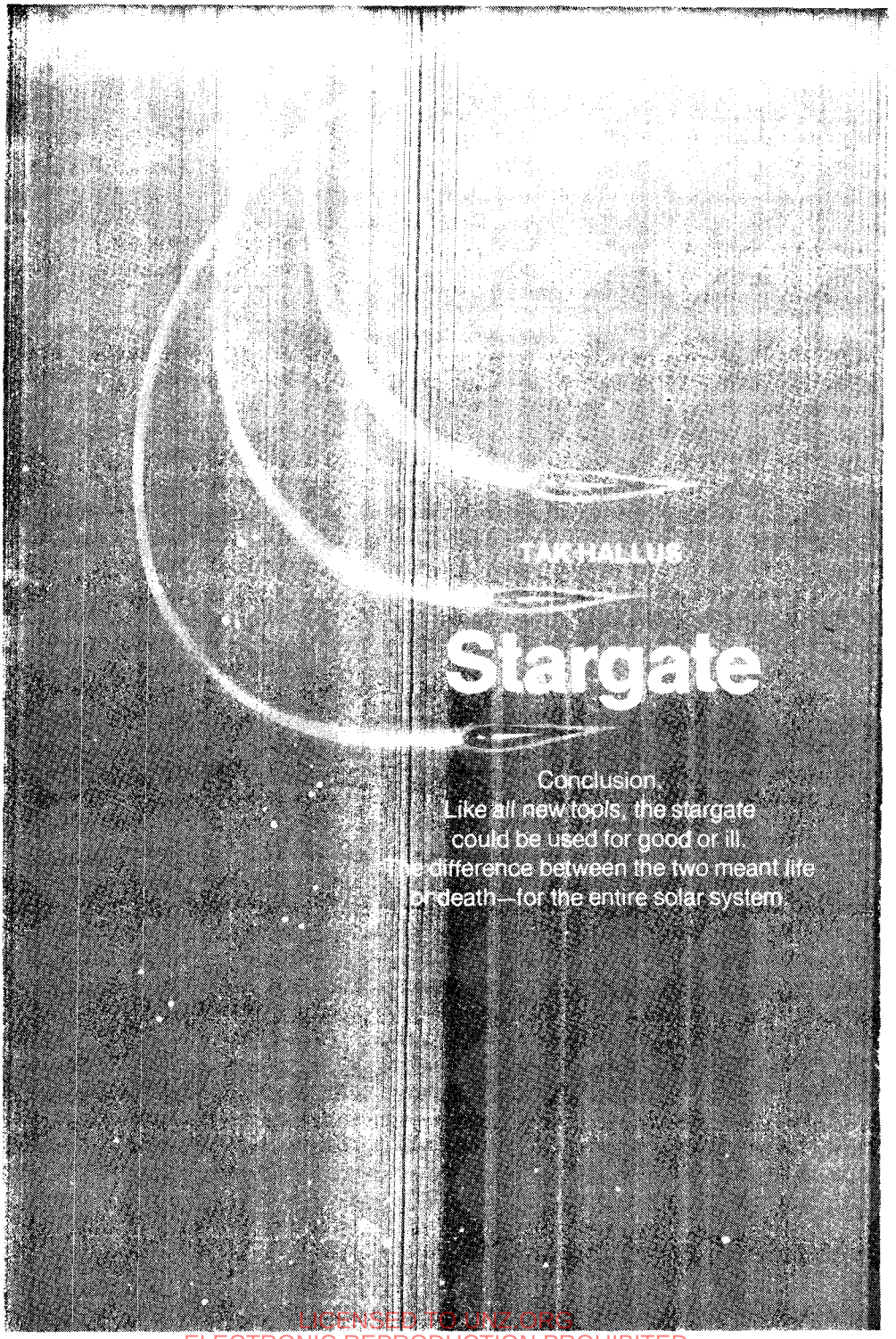
TAR-HALLUS
Stargate
Conclusion.
Like all new tools, the stargate
could be used for good or ill.
The difference between the two meant life
or death—for the entire solar system.

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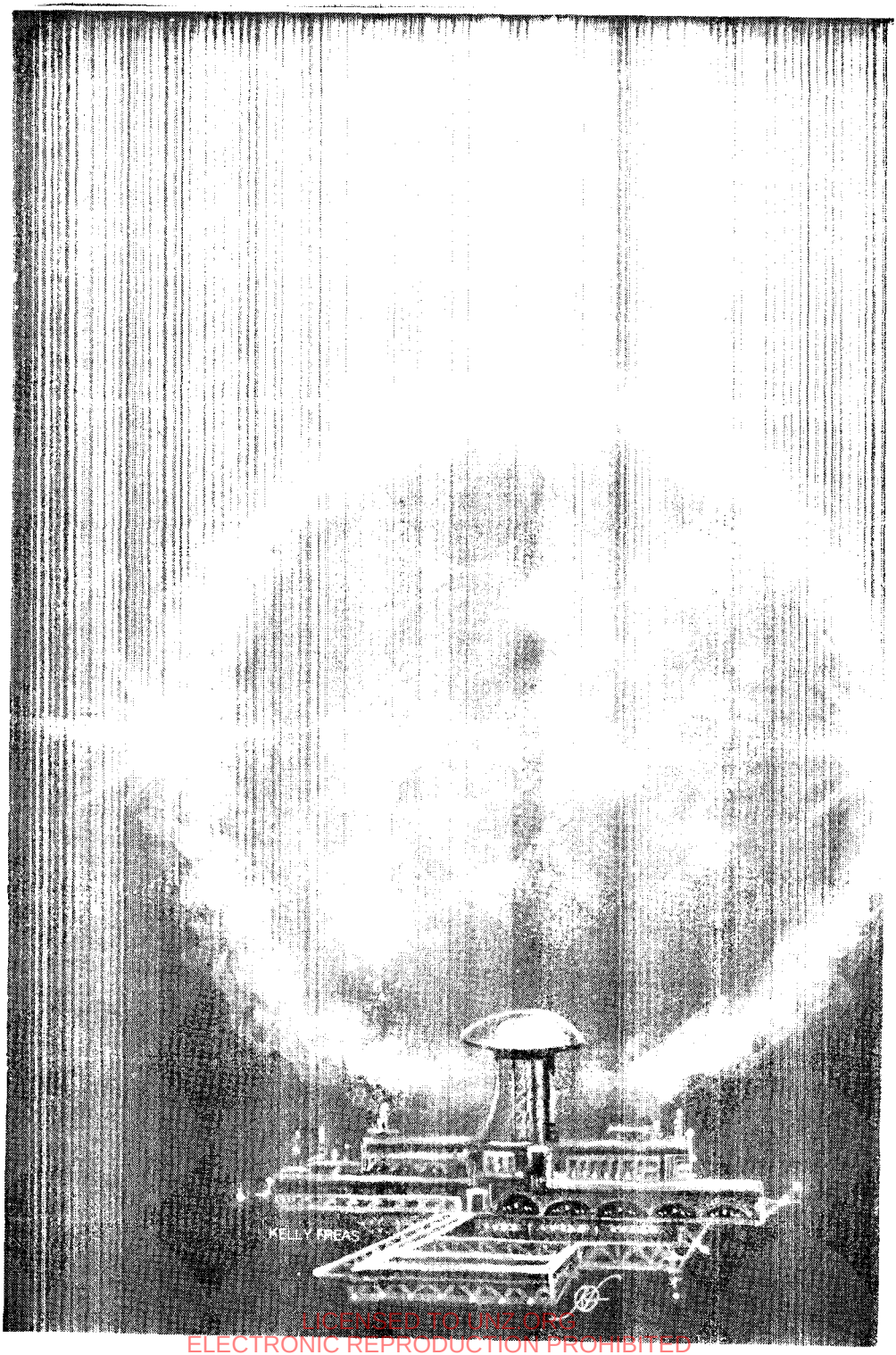

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SYNOPSIS

Me? I'm Robert Collins, Chief Project Engineer on the space station Merryweather Enterprize. *Mr. Merryweather hired me to finish the matter transmitter his previous project engineer, the late Dr. Norton, was building in solar orbit out near Mars. Twenty-eight, a moderately shiny PhD in Design Engineering plus a couple of years unrelated experience—and he still hired me. Phillip Duff, Mr. Merryweather's accountant and man Friday, opposed it—Collins was too young and the project itself too expensive. I opposed it too—my knees shaking at the thought of managing a ten-billion-dollar annual budget with one hand and trying to match Dr. Norton's inspired engineering with the other. Badgered by my girl friend, Dolores Gomez, I gave in.*

Problems ensued, problems unrelated to my new job. The late Dr. Norton's body disappeared. His wife, Sharon, unable to restrain herself at his funeral, pried up the lid of the closed casket. No Norton.

Mr. Merryweather sent Duff and me out to hire Scarlyn Smith, a retired troubleshooter, to find Norton. He also wanted to know if Frederick Spieler, his prime competitor, was involved. Spieler, the thirty-nine-year-old-financial-whiz-kid-billionaire owner of Spieler Interstellar, runs a drone mining fleet. It uses modified matter transmitter principles to get across the galaxy and is extremely unstable. One shipload of niobium ore, even if it takes an eight-year round trip at sub-light-speeds to obtain, will easily pay for nine lost drones. Tantalum, extracted from niobium ore, is used to construct matter transmitter focusing rings, among other things. The demand is almost insatiable.

Duff and I found Smith—seventy-five, though he looked a healthy sixty—living with his daughter and her banker husband, H. Winton Tuttle—"Harold," to Smith. Smith refused the job. Duff convinced him to at least think about the offer.

At home that night, a salesman named Parry called me, trying to make an appointment for the following Saturday morning. I refused. Immediately afterward, Smith called, bubbling with orders for me. He had changed his mind. I was supposed to correlate Dr. Norton's phone calls from the space station with his progress reports on the Big Gate. Norton, who kept everything in his head, had left only the progress reports. I did the correlation, discovering a recent call from Parry. Smith sent me off to lunch with Parry, informing me that Fenton Laser Products, Parry's employer, was owned by Spieler Interstellar.

During an excellent meal and rotten music—a German oom-pah band—Parry tried to bribe me. How much? How much, indeed! Not mere money, but fame! If only I would give him construction updates on the Merryweather Big Gate, he would get me laser innovations for the Gate

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power supply that I could pass off as my own ideas.

I told Smith. He wanted me to string along with Parry, but to be careful about any information.

The next Tuesday, I got my first visit to the Merryweather Enterprize. *Technicians put Smith and me into spacesuits, preparing us for the matter transmitter trip to the space station, accomplished through a string of satellite relays. While we were waiting to use the Gate, Smith got word Norton was turning up, piece by piece, a liver here, a kidney there. Someone had fed the body into a partially spray-focused matter transmitter.*

Suited up, we took the elevator to the transfer surface. I asked Smith whether he had his cigar in the helmet with him. Before he could answer, the Gatekeeper thumped my helmet. I stepped through the shimmering air.

The station, a standard wheel construction a half-mile across, appeared around me. Smith and his cigar followed. Captain Wilkins gave us the grand tour, including my first sight of the Big Gate focusing ring, a hundred-and-eighty-kilometer circle of solid tantalum, cast section by section in space. Completed, it would rip out a chunk of planet fifteen kilometers across that would contain more ore than Spieler could hope to carry in a drone ship.

When I got home that evening—after a day trying to get my feet on the ground in the space station, a tricky operation—Smith arrived, inviting himself to dinner. We fed him, learning why he finally took the job, a matter of pride and dignity combining to make him prove himself again.

The next morning, we followed up one of Smith's leads, learning that Spieler had not only removed Dr. Norton's body, but the brain from the body and the memory from the brain, or most of it. He missed the crucial part, Dr. Norton's tachyon conversion, a modification of basic Jenson displacement principles that permits the Big Gate to accelerate matter to super-light-speeds. Almost instantaneous star travel was within our reach.

Later, Smith, single-handed, invaded Spieler Space Operations in Tustin, noticing large numbers of armed men. About the same time, two unidentified spacecraft appeared off the Big Gate, lurking but otherwise inactive.

Smith wanted a closer look at Spieler himself. Spieler, competitive almost from the cradle, took only three hours a week off, Saturday nights at his nightclub. "Coincidentally," we visited it.

A direct man, Spieler confronted Smith, who used what we knew so far to lean on Spieler. Spieler reacted, showing the extent to which the Big Gate threatened not only his financial empire but his personal identity.

After the meeting, I lost myself in my work on the Big Gate. The mod-

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ified lasers for our controlled-laser reactor, supplied by Parry, promised more power than we could possibly use. Maximum power in our computer model of the reactor ran off the scale.

On the morning of our first test, Smith showed up. We prepared the Gate. Dr. Steichen, the Merryweather astronomer, chose our test planet. We positioned cameras to observe the Gate. In the crowded control room, I flipped up the third safety cover on the Gate controls and activated the transmitter. The plate glowed red beneath my finger.

Part 3

XIII

We waited. Ten. Fifteen. Twenty minutes. Smith, standing next to me, found a match and lit his cigar. The pungent smell drifted over the heads in the crowd. No one complained. No one noticed. They watched monitor screens, tense, anxious, their attention rapt. Smith glanced around, impatient.

"Is this thing gonna work?" he asked.

I pointed to the power readout. The load had increased. "We've got one on the line right now."

"A big one?"

"It's set on maximum. Fifteen kilometers across and two deep."

I glanced at the "Duration" indicator. Three seconds, two, one. The rock—ripped from the surface of a planet eight light-years from Earth—burst from the center of the ring, rushing at the nearest cameras, filling screens.

Pandemonium exploded in the control-room, cheers, shouts, whistles. I looked from screen to screen, fascinated. Successively, each of the nearest cameras winked out. The rock had passed them. Only the distant cameras tracked it.

I checked the summary readouts in front of me. The chemical analysis, made as the rock materialized, was better than anticipated. Forty percent niobium ore, rich in tantalum. Fifty-eight percent miscellaneous. Two percent vegetation.

"Congratulations, buddy boy," said Smith.

"Congratulate Norton. I—we just put his toy together."

"I wasn't talking about the Gate. I meant Spieler."

"What's he got to do with—"

"You just put him out of business. From now on, his drone ships will arrive and find nothing but stripped worlds."

Somehow, the way Smith said it—stripped worlds—bothered me. He pointed at the chemical analysis readouts.

"What's this two percent vegetation?"

"Jungle, probably," I answered. "Africa's still the best source of niobium on Earth."

"Apes, lions—that kind of jungle?"

"There was no animal life indicated."

"*This* time."

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"What's that supposed to mean?"

"Nothing. Just a thought."

The thought, clear enough without being articulated, bothered me. I imagined an intelligent race somewhere in the galaxy developing a Big Gate, reaching across the stars and ripping out fifteen kilometers of Los Angeles. No great loss, you say? Only if you're not ripped out with it.

Smith moved through the crowd to the transparent wall. I followed, stopping next to him and looking out. The Gate, a quarter-inch circle to our unaided eyes, hung below us, its solar orbit synchronized with ours. The rock, a speck, drifted rapidly away from the center of the ring. I ordered Rodriguez out with constructors to slow its drift and match its orbit to the station, then had Burgess shut off the Gate.

People congratulated me, shaking hands and returning to their duties. I stayed in the emptying control-room, watching the Gate and the new asteroid. During the weeks of preparation, I had pushed aside the implications of the Gate. Too many technical problems impinged. Technical problems, though complex, were more susceptible to solution than moral problems.

"Smith."

"Hm-m-m?"

"I have a question. It may sound dumb, but it bothers me."

"Shoot."

"See that Gate out there?"

"Yes."

"Was it right to build it?"

Smith looked at me, smiling around his cigar. He seemed about to say something sarcastic, then recognized I was serious. "What's 'right' mean?"

"Morally right."

"I don't suppose the Pope will mind."

"That isn't what I meant."

"Murky waters, morality."

"In itself, is it right or wrong?"

"Das Ding an sich."

"What's that mean?"

"The thing in itself. It's an old argument. Is a gun, in itself, wrong?"

"A gun's just used in a small area," I answered, begging his question. "*A* shoots *B*. Murder with it is wrong. Self-defense isn't."

"You're sure."

"Yes. Why?"

"Some people aren't. They even think killing in self-defense is morally wrong. What about a billion guns? Is that a billion small areas or a global war?"

"The Gate is one thing, Smith, one thing with a potential so devastating it's beyond either of our comprehensions."

"Speak for yourself."

"Think about the revolution the Wright brothers caused."

"Yep. Fighter planes and passenger planes. Take your pick. But you've got the moral shoe on the wrong foot."

"I do?"

"Morality applies to human ac-

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tions, not things." He relit his cigar. "*An sich* or otherwise."

"OK. Were *we* right to build it?"

Smith shrugged. "Who knows? It's done. If *you* hadn't finished it, someone else would have. Spieler, maybe. It was ready to happen. I'd rather have Horace playing with it than Spieler."

"Dr. Collins," interrupted Captain Wilkins. "Mr. Merryweather wants to talk to you."

"Thank you, Captain. I'll take it in my office. Tell me when Rodriguez gets the rock in orbit."

Mr. Merryweather congratulated me, indicated I would find a substantial bonus in my pay envelope and asked to talk to Smith. Out of range of the phone, I could only see and hear Smith. He nodded, listening intently, said OK several times and hung up.

"Let's go, buddy boy."

"Go? Where?"

"To the surface. Horace had a man watching Spieler Space Operations in Tustin. When your pebble bounced out, all hell broke loose."

Smith started out the door. The phone hummed.

"Just a second," I said. I touched the phone. Pamela Rysor came on the screen.

"Mr. Parry is on the line."

Parry? I looked at Smith.

"Right on schedule," said Smith. "Talk to the man."

"Put him on, Miss Rysor."

Parry's plump face came on the screen, smiling pleasantly.

"What can I do for you?" I asked.

"Nothing at all, Mr. Collins. I'm just calling to complete our little bargain."

"What bargain?"

"Come, come, Mr. Collins. A man of your abilities must have an excellent memory. We were to have exchanged certain information. I have fulfilled my end of the exchange."

Either Parry knew nothing about the security recordings kept on all calls to the *Merryweather Enterprize*, or he didn't care.

"What do you want to know?"

"As I told you, nothing as specific as the information I furnished you. Tell me, did our lasers prove satisfactory?"

Parry knew the lasers worked well. Spieler's two ships, still stationed off the Gate, would have reported our success. Smith, evidently thinking the same thing, nodded *yes*, indicating I should answer Parry.

"They performed satisfactorily."

"Good. I'm glad to hear it." He sounded glad. "Was there enough of a safety margin?"

"Safety margin?"

"The load placed on the reactor by the Gate—was it severe?"

Knowing the load, Parry could calculate the Gate's power consumption. The fact seemed harmless. It would only tell Spieler the grasping power of the Gate during our test, something he probably

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knew already. It would reveal nothing about the workings of the Gate itself. Just because you know that Boulder Dam produces so many kilowatt-hours of electricity, doesn't mean you know how. A salesman, furnishing lasers for a reactor, would probably ask the question. I looked at Smith. He shrugged, leaving the decision to me.

"No, the load was not severe," I said.

"Excellent. I'm glad our product performed well. What, exactly, was the load?"

I looked worried. Parry tried to seem reassuring.

"Dr. Collins, our technical people would like to check their calculations."

I still looked doubtful.

"Come, come, Dr. Collins. We had a bargain."

I told him. He looked satisfied.

"Not bad at all. Plenty of room to spare. Thank you for your time, Dr. Collins." He hung up.

Smith raised his eyebrows, bewildered.

"What was that all about?" I asked.

Smith pondered, staring at the floor and pulling on the cigar in his mouth. "I don't know."

"You don't *know!* You're the one who's *supposed* to know! The answer man! I thought Parry was supposed to *black*mail me or something! That's what you said when you were one step ahead of them."

"Maybe I was wrong."

"This is a hell of a time to be wrong!"

Smith began pacing my office, chewing on his dead cigar and working it from side to side in his mouth. "Was there anything funny about the lasers you got from Fenton?"

"Funny?"

"Anything wrong with them?"

"If you're thinking of sabotage, forget it. They were perfect. I had our best engineer in charge—"

"You?"

"No, Bernie Mitchel. He went over them with a fine-toothed comb. They were perfect. In fact, they were better than perfect. Installed in the reactor, they could produce more power than we needed."

Smith halted, withdrawing the cigar from his mouth. "Better than perfect?"

"That's right. So what?"

"More power than you needed?"

"Yes."

"That's what Spieler was confirming, that there was surplus power. There's something to it."

"What?"

"Damned if I know. Let's go."

"Where?"

"Tustin."

Smith parked the Ferrari a block from Spieler Space Operations, out of view behind a slope. We walked the block, Smith strolling, glancing around as if out for his morning constitutional.

"Beautiful day," said Smith.

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I snorted. From Corona del Mar to Tustin, Smith had said nothing, intent on his driving. I tried to coax his plan from him. He remained quiet. I began to suspect he didn't have a plan.

We reached the crest of the slope. Spieler Space Operations, a cluster of low buildings surrounded by a chain-link fence, spread out below us. I recognized the administration building from Smith's description. The rest of the buildings looked anonymous.

"Smith."

"Hm-m-m."

"What are we supposed to do here?"

"Poke around."

"How?"

"Beats me. Play it by ear."

"Play it by *ear!* If they catch us, they'll hang us by our ears!"

"I guess we'd better be careful then," said Smith, coming to a halt. "Ah, here it is. I thought I noticed this the other day."

Smith stepped off the sidewalk and began following a worn dirt path next to the fence. I glanced into the compound. If all hell had broken loose, someone had caught it. The place showed no signs of life. The more I thought, the more anxious I became. Smith clearly intended to get inside. It was broad daylight. Aside from what Spieler might do, there were laws against this sort of thing. I glanced at the open area between the fence and the buildings, imagining myself running across it.

"Smith."

"Hm-m-m?"

"Can't we come back tonight?"

"There won't be anyone here tonight."

"I know."

Smith stopped and squatted. "I thought I'd find this."

"What?"

"A hole. Kids and dogs hate fences."

I looked at the base of the fence. The wire mesh, buried for most of its length, was stretched over a narrow divot. Only a kid or a dog could get through it.

"You don't expect me to crawl under there?"

He pointed at the top of the fence. "You could go over."

"I'm not dressed for this kind of thing."

"Neither am I. Put your coat on inside out." He dug in his coat pocket, coming up with a plastic disk. "On the other side, turn your coat right side out and put this on the picket."

I glanced at the disk, green, inset with my picture. I read the inscription around the picture. Robert Cluggins, Spieler Space Operations, Supervisor.

"Cluggins?"

"Like it?"

"Not much. Where'd you get these?"

"Don't ask. It might tarnish your image of Horace."

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Smith reversed his coat and put it on, sealing it to the collar. He cleaned out the hole with both hands, removing twigs and dirt.

"Give me a hand here."

We pulled the bottom of the fence up as high as possible, adding another six inches to the clearance. Smith got down on his back and squirmed under, inching forward like a soldier penetrating barbed-wire.

"Can't I just hand my coat through, Smith?"

"No. You might get the front of your shirt dirty when you crawl under."

"What about my pants?"

"They're dark enough so the dirt won't show. Besides, who looks at pants?"

I turned my coat inside out and followed, squirming under the fence. The lining ripped on a stray wire. Inside, we brushed each other off and prepared to start for the buildings.

"Smith, this is absolute lunacy."

"Straighten your cravat." He pointed at one of the buildings. "That's their Gate. Where do you suppose everyone is?"

"Waiting in ambush."

He ignored me. "The building next to the Gate is the one we want."

"What is it?"

"Their computer center."

We walked across the open area toward the buildings. I kept glancing around, apprehensive. Smith strolled, enjoying the warm weather.

"Relax, buddy boy."

I felt like the cavalry going into a box canyon. Indians, behind every rock, watched us, waiting, bows taut. Once trapped, they would pounce. I imagined myself staked spread-eagle on an ant hill, Spieler, a feather protruding from behind his head, laughing, sprinkling sugar on me.

"Smith," I said when we reached the nearest building. "Where *is* everyone?"

"Out to lunch?"

"If they let us in, they're out to lunch all right."

Smith paused outside the computer center. "Let me do the talking."

Inside, there was no one for Smith to do the talking to. The corridor stretched out in front of us, empty. We checked several offices. Empty. Our footsteps echoed in the hall. I remembered the Merryweather computer center, busy even on Saturday nights.

"It must be Spieler's birthday," said Smith. "Everyone's at the party."

"Spieler's birthday's in January."

"That's a joke, son."

"Where *are* they, Smith?"

"You got me."

We continued down the hall, passing empty rooms. Several of the rooms looked recently occupied, coffee cups on desks, com-

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puter displays still lit, processing data. I began to get an eerie feeling. Somehow, everyone in the building had simply vanished.

"Have you ever seen any of those old Japanese pictures?" asked Smith.

"A few. The classics. Kurasawa. That sort of thing."

"Did you ever see *The Crud Eats Again?*"

"No."

"It opened with a scene like this. Empty buildings. Machines running. No people."

"Where were they?"

"The Crud ate them."

Ahead of us, a man in a business suit popped from a door, halted, inspected us and disappeared into a room on the opposite side of the hall.

"Crud didn't get him," said Smith, picking up his pace. He turned in at the room.

The man looked up from a computer printout, his round face startled.

"Oh!"

Smith scowled. "Why are you still here?" he demanded, his voice authoritative.

"Sorry, Mr., eh—" He glanced at Smith's identification disk. "Smythe, I'm just finishing up here."

"Who are you, anyway?"

The man's eyebrows went up. "Me?"

Smith scowled even more deeply and plucked the identification disk from the man's suitcoat, reading it.

"Higgins. Astronomer." Smith grunted, returning the disk. "You've got no business in here today, Higgins."

"I know, sir. But I had to—"

"You had to what?" snapped Smith.

"I had to—"

"Come, come, Higgins. Cluggins and I don't have all day."

"Let him talk," I said.

Smith sneered at me.

"Thank you, Mr. Cluggins," said Higgins. "I was running a program on these coordinates, sir. They're all wrong."

"What coordinates?" asked Smith.

Higgins looked at Smith, dubious. He glanced at Smith's identification again, then mine.

"Green clearance," said Smith, impatient.

Higgins, anxious, made up his mind. "I have to tell someone. Mr. Spieler simply would not listen. Look at this!"

Higgins ripped four feet of printout paper from the computer's typewriter, handing it to Smith. Smith glanced down the sheet, uttering noncommittal "Hm's" and "Ah's" and trying to look intelligent. He handed the sheet to me.

"Now, Higgins," said Smith, official, brisk, "What's all this about?"

Higgins, continuing to look at Smith, pointed at the sheet in my hands, his expression distraught. "There! It's *all* there!"

I looked at the sheet. Somehow,

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it seemed familiar. The longer I studied it, the more significance it gained. Dr. Steichen, just prior to testing the Big Gate, had shown me similar coordinates. Steichen's figures programmed the matter transmitter's focal point.

"These are drone ship coordinates," I said, guessing.

Higgins's expression changed, lighting up. Someone, at least, understood.

"Yes, Mr. Cluggins, exactly. But they're no good. No good at all. Look at this." He poked at an equation. "And this." He jabbed at an expression. "It's some horrible mistake!"

"Why a mistake?"

"Do you *know* where that is?"

I looked at the equations. "No."

"The *Crab Nebula*, Mr. Cluggins! The Crab!"

"The Crab."

"Itself!"

"So?"

"Sooo?" he mimicked, indignant. "Sooo? What do you think the Crab Nebula *is*, some sort of seafood?"

"Crab Nebula," mused Smith. "Sounds good."

"It's *horr*ible!" shouted Higgins, snatching the printout from my fingers. He folded it into a neat square.

"Why?" I asked.

"If Mr. Spieler sends a drone ship *there*"—he jerked his thumb at the ceiling—"it will *never* return!"

"Most of them don't."

"Yes, but why compound the problem by simply *throwing away*"—he flipped the printout onto a desk—"ships. Money is still, I'm told, money."

"Why won't it come back?"

"First of all, a round trip takes eight thousand years!"

"A pretty impressive 'first of all,' " said Smith. "What's second?"

"The *Crab*, Smythe! The *Crab!*"

Momentarily, the Crab blended in my mind with the Crud. Question: what happened to Spieler's drone ship? Answer: the Crab ate it.

"The Crab will eat it?"

"Yeees!" said Higgins, his tone patronizing. "Now you've got it!"

"I do?"

"What Crab?" said Smith. "I think I missed something."

"The Crab," I explained, bewildered, "in the Crab Nebula."

Higgins nodded, agreeing with me. Before I wrote Higgins off as a complete maniac, I decided to try for clarification.

"Dr. Higgins, I was unaware there was a *real* Crab in the Crab Nebula. I—"

"Show how much *you* know. All you bureaucrats are alike. Give orders right and left, but when it comes down to *know*ing something—down to the real—" Higgins' hand flapped in front of his mouth, trying to coax out the proper word.

"Nitty-gritty," suggested Smith.

"What does that mean?" inquired Higgins.

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"Essence. It's old slang."

"Essence! That's it! When it comes to the real essence, you bureaucrats are absolute gritty-nit-wits!"

"I don't think," said Smith, "the word was used like that, but I rather like it."

"Ignorant as stones," concluded Dr. Higgins.

"I was under the impression," I persevered, since Smith seemed intent on his diction reverie, "that the Crab Nebula was so named because of its appearance."

"Quite right."

"Then where does *the* Crab come in?"

"It doesn't come in anywhere. It's been there all along."

"You're a difficult man to talk to, Dr. Higgins."

He grunted, contemptuous. "*The* Crab, Cluggins, is a pulsar. I like to think of it as having *a* crab inside, snapping up any bits of matter that get too close."

"You do."

"Yes."

"And in reality," I said, my patience exhausted, "what is it?"

"A pulsar. I just told you. M-1, very young. The Japanese and Chinese observed its nova in the mid-Eleventh Century, you know. One day—mark my words—it will become a black hole. One day, *every*thing will become a black hole."

"But now it's just the Cr—I mean the pulsar."

"Correct."

End of the line. I knew, vaguely, about pulsars, giant blue stars collapsed during a supernova to a few kilometers in diameter—a spinning neutron star. One fact eluded me. Why, all things considered, did Spieler want to send a drone ship to a pulsar? He could have more fun just burning a billion dollars in his backyard. A drone could never land on a neutron star. I asked Dr. Higgins.

"I'm sure I don't know. I told you, it is some kind of mistake. Holiday or no holiday, I *must* convince Mr. Spieler."

"What do you make of it?" asked Smith.

I shrugged.

"Does it concern us?"

"Con*cern* you!" interrupted Higgins. "It is *vi*tal to the company! *Vi*tal!"

"Who knows?" I answered. "Maybe."

Higgins snorted something like an imitation of my "maybe" and reached for his printout. I grabbed it off the table.

"We'll take care of this for you."

"But—" Higgins looked from Smith to me, his eyes narrowing. "Who are you?"

"Cluggins."

"Smythe."

Before either Smith or I could react, Higgins bolted, scurrying to the door and out. Smith hesitated, wondering whether to pursue. Higgins' footsteps receded. A door slammed.

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"Forget him," I said. "Where's a phone."

Smith pointed. I touched on the phone and tapped out the direct number to the *Merryweather Enterprize.*

"Wilkins," said Captain Wilkins. "Control-roo—oh, it's you. People have been trying to get hold of—"

"Give me Dr. Steichen, fast."

The screen went blank. Captain Wilkins knew enough not to argue with me. I waited.

"Come on, Steichen, *come on.*"

Steichen's face came on the screen. I started talking immediately. I told him to listen. When I finished, he could get a playback from the security recording of the call. He looked startled to discover his calls were monitored but had the sense to accept it and listen. The phone did not have a document feed so I had to read the printout. Four pages of English can be read in a few minutes. Four pages of math, especially sight-reading someone else's math, takes forever.

"You about done, buddy boy?" asked Smith, glancing into the corridor.

"No."

"You better get done. Someone's coming." He kept looking down the corridor. "Scratch that. A lot of someones are coming."

"Well, close the door."

"Good idea."

I continued reading. Smith closed the door and blockaded it with a desk chair. I started into the fourth foot of paper. Steichen stopped me once or twice to verify an expression, trying to copy while I read.

"Just get it off the tape, Steichen. I don't have time to wait for your shorthand."

I read, trying to be precise and quick. People pounded on the office door. The pounding became a rhythmic thudding, shoulders applied to the outside of the door. Smith, pushing against them from the inside, bounced with each thump.

"I can't hold this much longer, buddy boy!" shouted Smith. "Hurry up!"

"I'm hurrying."

I read.

"How much longer?" shouted Smith over the thumping.

"One minute."

Smith stepped back from the door. Spieler's men hit it. It flew open, brushing aside the desk chair. A squad of green-uniformed guards spilled into the room. Smith threw up his hands.

"We give up."

Only the leader, a short, moderately grizzly but extremely furious man, had his gun drawn, aiming it at Smith. The others, intent on breaking in the door, had holstered their weapons.

"*You,* again!" said Grizzly.

"Hiya," said Smith.

"Frisk them," ordered Grizzly, then noticed me muttering to the

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phone. The muzzle of his gun swung to me. "*You!*"

I looked up. "Me?"

"*Get away from that phone!*"

Before I could respond, Smith moved. A foot clipped Grizzly's gun arm—the gun flew—an elbow jammed a solar plexus, rabbit punches here, karate chops there—all placed with speed and precision. Men slumped, collapsed, groaned and gasped.

I read off the last equations to Dr. Steichen.

One of the guards, dazed, staggered backward past the camera. Dr. Steichen watched him.

"What's going on there, Dr. Collins?"

"Dance contest. Analyze that stuff and tell me everything you can about it."

"All right, Dr. Collins?"

"What?"

"Why would anyone want to go to the Crab Nebula?"

"*That*, Dr. Steichen, is what we want to know."

A shot exploded, deafening in the crowded room. The phone-screen in front of me shattered. Everyone stood motionless, watching Grizzly with his gun. Smith's hands went up.

"We give up."

"That's what you said last time," said Grizzly.

"I lied last time."

XIV

Embarrassed? Too mild a word. Chagrined? Yes. Humiliated? Yes. Genetic ID. Photograph, head-on, *click*, profile, *click*. Voiceprint. Fingerprints. Duff bailed us out by four o'clock. They gave us the plastic bags with our personal effects. We left.

On the steps of the Tustin Police Department, Duff positioned himself to my left to avoid walking next to Smith.

"What did *he*," asked Duff, meaning Smith, "think we would gain from this escapade?"

"Ask him," I suggested.

Duff snorted, preferring to imagine Smith elsewhere.

"*He*," said Smith, "thought if it was fair for Spieler to strip Norton's memory, it was fair for us to strip theirs."

In jail, Smith had told me his original plan. He wanted to patch Spieler's computer into the Merryweather computer and drain it. Whatever Spieler was planning would leave traces somewhere in the computer. I told Duff.

"Did *he* know how long it would have taken to sift the entire contents of Spieler Interstellar's computer center?"

"I doubt it," I answered.

"*He* knew," said Smith, "that any clue would be somewhere within the last three months' input and that three months' input would not take all that long to analyze. Sometime during the last three months, Freddy Spieler figured out that he lost the ball game. That's

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when he made up his mind."

"To do what?" I asked.

"If I knew that, buddy boy, we wouldn't have wound up in the hoosgow. But we've got old Higgins' mistake now. We couldn't have hoped for more."

"We couldn't?"

"Nope."

"What, exactly," said Duff, addressing his question to me, "*is* old Higgins' mistake?"

"The Crab, Duff," said Smith. "The Crab!"

"Very helpful," said Duff, disgusted.

We reached Duff's Mercedes. Smith rode in the back seat, staring out the window, thinking. I rode in the front.

"One thing still bothers me," said Smith, lighting a cigar.

"Do you *have* to smoke that thing in here?" protested Duff.

"Yes."

"What still bothers you?" I asked.

"Jail."

"It bothers me, too."

"Why did Grizzly and company turn us over to the police?"

"Try this," said Duff, momentarily glaring into the rear-view mirror. "You *trespassed* on their property, *broke into* one of their buildings, *impersonated* an employee, *terrorized* an astronomer . . ."

"Terrorizing astronomers," said Smith. "Serious charge."

". . . and *broke up* half a dozen guards. One of those men is *still* in the hospital!"

"Only one," said Smith. "I'm slowing up."

"If you're slowing up," said Duff, hopeful, "you should retire."

"Tried it," answered Smith. "It's no fun." He looked at me. "Why, buddy boy, did they put us in the slammer?"

"What would *you* have done in their place?"

"Shot us."

I looked at him. "Are you serious?"

"*I* wouldn't have shot us, but if *I* were them, knowing them, I would have shot us. Or at least shipped us off to Timbuktu."

Smith had something. I had expected them to shoot us, or worse. Grizzly had left his men to guard us and made a phone call, presumably to Spieler. When he returned, his expression looked sour. Someone had taken the joy from his life.

"We've gotta turn you birds over to the police," he said, and did, personally signing the complaint at the Tustin Police Station.

"You may have something there, Smith," I said.

"Yep. But what?" responded Smith, becoming aware of the road outside. "Turn here."

"What does *he* want now?" asked Duff.

"He wants to turn here."

"No."

"Why not?"

"I re*fuse* to take him back to

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Spieler Space Operations. I have had enough trouble for one day. I had to break an engagement to come here."

"With Sharon?" asked Smith.

Duff remained silent. It did seem to me Smith had gone too far. Duff's relationship with Sharon Norton had entertainment value, but Duff was the wrong man to share the humor.

"Pull over, Duff," said Smith.

"Why?"

"I want to talk to you."

Duff pulled over, letting the engine idle. "What is it?"

"I don't want you to see Sharon Norton until this is over."

"You *what?*" shouted Duff, turning and glaring into the back seat. "What right do you have to order me—"

"Shall we take it up with Horace?"

"*Yes!* Damn it, Smith! Every time I see you, you make havoc out of *every*thing! Mr. Merryweather can override me on hiring you, *and* on giving you the kind of authority he has, but when it comes to *my* private life, it is none of *your* damn business, *or* his! Do you understand that?"

"Call Horace," said Smith.

Duff picked up the phone, cradled between the two front seats, quickly punching out a number.

"Let me speak to Mr. Merryweather," said Duff. He paused. "Well, find him!" He glanced at Smith, glowering, waiting. "Hello, Mr. Merryweather, this is Phillip . . . yes, sir, everything went just fine. I got them out . . . no, no problems, except *him* . . . yes, sir, Smith—"

"Gimme that phone," snapped Smith, grabbing it from Duff's hand. "Hello, Horace . . . just fine, except old Duff here's giving me trouble. I told him not to see Sharon Norton . . . yes, I'm aware of your policy against interfering in your employees' personal lives."

"You *see!*" exclaimed Duff, triumphant.

"But this is business. Spieler learned about the tachyon conversion's existence from her."

"It's a lie!" said Duff.

"Let's just say I know, Horace, and forget the details. Spieler's relatively young and athletic, and just about her age, though that doesn't seem to matter too much. Norton was gone most of the time."

"That's the most ridiculous thing I've ever heard," said Duff.

"Spieler's a direct man," continued Smith. "If he wants to know something, he goes straight to the source, or as close as he can get . . . all right, here he is."

Smith handed the phone back to Duff.

"Yes, sir . . . but . . . sir . . . if . . . all right." Duff jammed the handset into the cradle. He sat, both hands on the steering wheel, glaring out the front windshield. Smith, his expression genuinely

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sympathetic, looked at the back of Duff's head.

"Sorry," said Smith.

After several moments, Duff spoke. "Where to now?"

"Spieler Space Operations."

I looked at Smith, wondering what he planned. My face must have shown my concern.

"I do have to pick up my car, don't I?"

I had forgotten the car. We dropped Smith at his Ferrari. Duff drove me home, silent, upset.

Dolores was out. I got a beer from the refrigerator and lay down on the couch. The range of excitement during the day had drained me. I wanted to rest and revive. First, the tension of testing the Big Gate. Second, playing spy at Spieler's. Third, being booked. Each took its toll. Spies reminded me of Parry. I sipped the beer. Parry had proved more helpful than many of the people working for Merryweather Enterprises. With his help, the matter transmitter could reach any corner of the galaxy, if the galaxy had corners. Do fried eggs have corners? I felt drowsy. We needed more spies like Parry. Helpful spies. Benign spies. Benign ghosts. I remembered Norton. And all the king's horses, and all the king's men . . . I dozed.

Somewhere far off, something hummed, persistent and annoying. I wanted to sleep. It hummed.

"Go 'way."

I rolled on my side. It hummed.

"Go away!"

It hummed. I opened my eyes, squinting at the phone. It hummed. I pulled myself to my feet and walked to it. I glanced in the mirror Dolores keeps by the phone, scratched my head, stuck out my tongue and yawned. My cowlick stuck up from my rumpled hair. I looked hungover, drawn and pallid. The intensity of my recent work was telling on my face. I glanced at my watch. Six twenty-five. I had slept an hour and a half. The phone hummed.

"OK, OK."

I touched it on.

A beaming, vaguely familiar face, male, grinned at me. "Hi."

"Hi."

The face looked disappointed. "You don't recognize me?"

"No."

"Most people do."

"Good for you."

"I'm *Roger Adair!*" He said it as though it were a recent discovery or a predicament. *I'm flying on air!* That sort of thing.

"Hi, Rog."

"You still don't know me?"

"Are you sure you have the right number?"

"Dr. Robert Collins?"

"Yes."

"Then I've got the right number." He mouthed "OK" to someone off camera, then looked at me. "Big day, huh?"

My patience, thin when aroused

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from a sound sleep, broke, "Listen, Roger Adair, what in the hell is all—"

"No one told you?" He looked genuinely startled, quizzical, mouth puckered into a tight "O" and eyebrows raised.

"No."

"Sorry. I thought they set it all up."

"They didn't, whoever *they* are."

"Ten seconds," he said.

"To what?"

"And *now*," said Roger, looking directly at me and smiling broadly, his voice robust, "on our Late Breaker Newsmaker On-the-Spotline, we have Dr. Robert Collins, the surprisingly youthful project engineer on the *Merryweather Enterprize* space station!"

It dawned on me. *That* Roger Adair. The six o'clock news.

"Tell us, Dr. Collins," continued Roger, beaming, "how does it feel to be in charge of the hottest scientific project since Jenson invented the Gate?"

"Feel?" I said, trying to determine how I felt about being awakened and thrust into millions of living rooms.

"Yes. What did you think when you saw the birth of the Collins asteroid?"

"The what?"

"Don't be modest, Doctor. Tell us your true thoughts. A little pride at a moment like this would not be hubris."

I couldn't remember what *hubris* meant. My true thoughts. I remembered staring at the monitor screens, the rock rushing at them, my attention riveted. I remembered my amazement that the Gate worked. Then I drew a blank.

"I don't remember actually."

"Don't remember," said Roger, incredulous. "It just happened this morning."

"It works. I thought something like that. The damn thing works."

"Now let me get that exactly. Historians will want to know. The damned—"

"Damn."

"Yes. Sorry. Damn. The damn—" He waited, expectant.

"Thing," I repeated.

"The damn thing—" He waited.

"Works."

"Excellent. Could you tell us a little about the future implications of today's success, for mankind in general and you in particular?"

"Well, first, there's the stars—"

"I'm sorry, Dr. Collins, we're out of time for our Late Breaker Newsmaker On-the-Spotline spot for tonight. Thank you for another in-depth, on-the-spot, *aaand* hot, interview!" The screen went blank.

"You're welcome."

I wandered into the kitchen, looking for something to eat. Dolores stocks the larder irregularly. She was into her "Big Push" toward final exams. During the Big Push, everyone suffers. I lost ten pounds during the last Big Push.

I opened two bags of dog food

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and dribbled them into a bowl. It looked better than what I would probably get. I took it outside to Dog. He galloped up, tongue flapping, and began slobbering over the food, gulping it down. The early evening air, chilly, cleared my mind. I sat down on the backsteps and watched Dog eat.

"What do you think?" I asked him.

He looked up from the bowl, bloodshot eyes watching me. *About what?* they asked.

"About the future implications of today's success, for mankind in general and me in particular."

The question must have bored him. He returned to his dinner.

"Consider this," I said, catching him with his mouth full so he wouldn't interrupt. "With only minor modifications of the Big Gate, men can walk directly from Earth to the other side of the galaxy." He seemed unimpressed. "Dogs, too."

I looked up at the sky. The first stars were appearing in the eastern sky. Once, men thought the stars were affixed to a sphere around the Earth, just out of reach. Copernicus, unintentionally, changed all that. The stars receded, vast distances making them inaccessible mysteries, every fact about them awesome, calculated to dwarf men, size, distance, composition, utterly incomprehensible. Now the stars were closer than the spheres had ever been. I told Dog.

He looked up, eyes asking *so?*

"The possibilities are staggering!"

Unstaggered, he licked the bowl.

"*All* the possibilities—for good or bad. We could send out shiploads of *conquistadores!* We could—" I stopped. Something about the thought disturbed me. Conquistadores? Stars? "Shiploads."

I stood up and went back into the house. I called the *Merryweather Enterprize.* Berkin, Captain Wilkins' night-shift counterpart, came on the screen, his face tan and relaxed. Working nights, he spent his days on the beach. He lived in a Merryweather community near Acapulco.

"Control-room, Berkin. Oh, hello, Dr. Collins."

"Is the captain there?"

"No, sir. After the success today, the big "M" gave everyone the day off. Minimum crew. Just us skeletons up here. Can I help?"

"What's the status of those two ships lying off the Gate?"

"Laying off," he corrected. "I'll check." He disappeared from view. While he was off camera, Dolores came home, slamming the front door.

"I'm ho-ome!" She padded down the hall to the living room, glancing in. "I *said,* I'm home."

"Hi."

"You're always on the phone nowadays. I saw you on the news at school."

"How'd I look?"

"Like you do now."

"How's that?"

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"Horrible. Your cowlick was sticking up. It was very funny."

"Thanks."

"Dr. Collins," said Berkin, returning to the phone. "They're still there. Condition unchanged."

Dolores left, heading for the kitchen.

"Does anyone have any idea what they're doing?"

"Captain Wilkins thinks they're observing our tests. They've definitely been identified as registered to Spieler Interstellar."

"Why don't people tell me these things?"

"We tried. We just identified them this afternoon. You were, eh, occupied."

I blushed. "OK. Any other news?"

"One of them's new, fitted with special equipment."

"What kind of equipment?"

"We don't know yet."

"All right. If anything else comes up, I want to know immediately. Even if I'm 'occupied.' Got it?"

"Yes, sir."

I started to hang up, then remembered Dr. Steichen. I asked if Steichen got anything from the coordinates I gave him.

"Hard to say."

"Why?"

"He went home with everyone else."

"Home! Give me his home number."

Berkin gave me the number. I hung up and tried it. No one answered. I tried Smith's number. No one home. I walked down the hall toward the kitchen, musing on the new information. Spieler had two ships, one specially outfitted, near our Gate. The Gate could reach out to anywhere in the galaxy. There was something to it.

"Dolores."

"Hm-m-m," she answered, stooped and staring into the refrigerator.

"What do you make of this?"

I told her about the successful test and its implications. I told her about Spieler's ships. She seemed slightly less impressed than Dog.

"Ask me something hard,"

"That's *easy?*"

"Sure. Spieler's going to fly his little rocket ships through your Gate."

"They aren't rocket ships."

"Whatever they are."

I thought about it. It was a "four" that matched my "two and two." But was it the right "four"?

"Why?" I asked.

"Now *that's* hard."

"Do you have any suggestions?"

"None. Maybe his fortune cookie said he should take a long trip."

I thought about it—not the fortune cookie, the idea of Spieler going through the Gate. Somehow it rang false. If Spieler planned to move his spacecraft through our Gate, one of three alternatives had to materialize (no pun intended). He could get our permission. Mr. Merryweather, a businessman,

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might give permission for the right price. To Spieler, it would be like kneeling before his enemy, surrendering his sword.

He could do it by stealth, waiting until the Gate was operative, then darting through. I laughed. Darting, Spieler could only go where we focused the Gate. Fine, if that's where he wanted to go. Otherwise, the potential was limited.

Or, he could use the direct approach. He could take the space station and use the Gate as he pleased. But why? What would he gain?

"I wish Smith were here," I said.

"Where is he?"

"I don't know."

Why would Spieler want to use the Gate? Even if he had free access to it and sent through drone ships, their cargo capacity was so much smaller than the Gate itself that he would gain nothing economically. Competition was out of the question. Perhaps he wanted to collect the ships currently searching the galaxy. But a few billion dollars in scrap metal would come nowhere near repaying the hundreds of billions invested. Nothing Spieler could do with the Gate, no matter how he gained access to it, would prevent his ultimate financial collapse.

"It doesn't make any sense, Dolores."

"What doesn't?"

"Spieler. Those ships. What can he gain by using the Gate?"

"Maybe he's not going to use it."

"What do you mean?"

"Maybe he's going to destroy it."

Destroy it! My Gate? "He *wouldn't!*"

"He might. Do you remember how he looked at Smith that night?"

I remembered Spieler's expression, twisted with hate. "What would he gain?"

Dolores thought a moment. Studying law has made her particularly adept at juggling hypothetical situations. She can take any side of a situation and see it from any viewpoint. I have heard her arguing with classmates on the phone, adding and subtracting facts from a hypothetical situation, changing viewpoints, working up a theory. I do the same thing with engineering problems but without people in the equation.

"Time," she said.

"But too many people know those two ships are his. If he tried anything, they would nab him right away."

"What if it looked like an accident?"

"Accident?"

"Sure. One of those little rocket ships, out there observing your test, accidently gets too close. Boom. Accident. By the way, how did Norton die?"

"Accident."

"That accident gave Spieler some time. What type of accident was it?"

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"I don't know. It was here on Earth, not the station. Something to do with a car. His car or someone else's. I don't know."

"It couldn't have happened at a better time for Spieler, could it?"

"I've got to find Smith."

I went into the front room and tried Smith's number. No answer. I tried the Merryweather Building. No sign of him. I was about to call H. Winton Tuttle, Smith's son-in-law, when an inspiration hit me.

I put the Greater Los Angeles Directory card in the slot. Nothing. I tried the Orange County card. I found the house on Balboa Island. I punched out the number.

The phone rang several times. I was about to hang up, when she answered, her pink housecoat slightly open at the throat. She looked at me blankly, a strand of blond hair disarrayed on her forehead.

"Yes?"

"Is Scarlyn Smith there by any chance?"

She looked startled, then composed herself. "Why would he be here?"

"This is important, Mrs. Norton. My name is Collins. I have to talk to him."

"Just a minute."

She left the screen. I could hear unintelligible shouting somewhere out of camera view. Eventually, Smith came to the screen.

"You just got me into a lot of trouble, buddy boy. What's up?"

"I see why you didn't want Duff to visit Sharon Norton."

"You're wrong."

"Am I?"

"Duff can't keep his lip buttoned."

"Sure, Scarlyn."

"You don't believe me."

"Sure, I believe you."

"Frankly, I don't give a damn. Now what's so important?"

That hurt. I realized how much I liked Smith.

"Sorry."

"Forget it."

"I think I've got a line on what Spieler's planning."

"Shoot."

I shot. I told him about Dolores' suggestions and my speculations. He nodded, a smile growing on his lips, occasionally interjecting "Yes," or "It fits." When I finished, he thought a moment.

"You're getting better at this game, buddy boy. Here's another fact to add to the heap. After I left you and the worry-wart this afternoon, I talked to Dr. Steichen. He finished analyzing the coordinates you gave him. Guess what he found."

"The Crab Nebula."

"Right. But he knew that as soon as you read off the figures. Bright guy. The coordinates weren't for a drone ship at all. They were for your Gate computer."

"But how—"

"Spieler got the specs from Master Toole in San Francisco. No one

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told *them* the information was classified."

"What's in the Crab Nebula?"

"Steichen agrees with Higgins. One pulsar, about a thousand years old. He even told me all about those wonderful Chinese astronomers who saw the supernova."

"Why would Spieler want to go to—"

"Who knows? The man's nuts."

"Even a nut *thinks* he has a reason."

"True," he admitted.

"Incidentally, how did Norton die?"

"Hit and run."

The screen flickered. In the upper right-hand corner, a girl's face appeared.

"I have an urgent call," she said, "for a Dr. Robert Collins from the space station *Merryweather Enterprize.*"

"I'm Collins," I said. "Can you put it on so both of us can see?"

"Yes, sir. But a conference call costs—"

"I'll pay for it."

Berkin's face, drained of its healthy color, replaced the operator's. He looked frightened.

"Sir, there are *men* on the station! *Armed* men! I can't get Captain Wilkins! What am I supposed to *do?*"

"How many men?" asked Smith.

"Fifty, sixty, maybe more!"

"How many men do you have?" asked Smith.

"Smith," I interrupted, "I know what you're thinking and you can't have a gun battle on a space station. First, our side doesn't have any guns. Second, if a bullet hits in the wrong place, everybody in that section of the station goes. And almost *every* place is the *wrong* place." I looked at Berkin. "How many men do you have?"

"Ten."

"Ten! There's usually a hundred up there at night!"

"Mr. Merryweather let everyone go," said Berkin, his voice sounding as though he were suffering physical pain. "Skeleton crew. What am I going to do?"

"Do you have any ideas?" I asked Smith.

"Nope."

I looked at Berkin. "Throw in the towel."

"But, sir—"

"We'll get as many men as we can to the company Gate, just—"

"Sir, they're in the control—" Someone pushed Berkin off camera. A hand reached across the screen and broke the connection.

"Meet you at the company Gate," said Smith and hung up.

XV

I was among the last to arrive at Corona del Mar. I had impatiently stared out the Mono window on the way down, cursing what seemed like the creeping pace of the car. Actually, it takes about the same amount of time to get from my place to the Newport Beach

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area by Mono that it does by car, but in a car you feel like you, personally, are doing something about getting there. When I did arrive, I was glad I took the Mono. The parking area around the blockhouse looked like a traffic jam.

Smith's red Ferrari, Duff's gray Mercedes, assorted black and white police cars, plus twenty or thirty other cars, stood at odd angles around the lot, hurriedly parked and abandoned. I walked down the access road, finishing the apple in my quickly scrounged dinner. A low Ford shot past, stirring a cloud of dust. It stopped in the middle of the road. One of the day-shift Gatekeepers jumped out and sprinted to the blockhouse. I followed.

Inside, I wormed through a mass of solidly packed humanity, working my way toward the suitroom. A policeman barred my way.

"Sorry, buddy. Nobody past this point but the bigwigs."

"My name's Collins."

"Mine's Avery," he responded, polite, friendly, still blocking my way.

"I'm a bigwig."

"So am I," he said, "to my wife."

"Listen, Officer—"

"Sorry. Can't do it. You reporters are always trying to get past us. Tell them to send someone older next time. Everyone in that room is over forty. One's past seventy. Tell—"

"I'm not a reporter. Ask someone in there, please."

Reluctantly, he retreated into a room off the hall. Almost immediately, Duff, red-faced, appeared in the doorway, yelling at me.

"Where the hell have *you* been?"

"I just got here."

I followed Duff into the room. The policeman left, muttering about bigwigs getting younger every day. Captain Wilkins, Smith, the head Gatekeeper and two other men, plainclothes detectives, stood around a desk with an unrolled plan of the *Merryweather Enterprize* before them, held down by coffee cups.

"Where's Mr. Merryweather," I asked.

"Mutombo Mukulu," answered Duff. "He'll be here as soon as he can."

I was introduced to the two detectives. They seemed relieved to have something to do other than stare at the space station chart.

"What's everyone still doing here?" I asked.

The silence, as they say, was deafening. Duff bit his lip, holding back an outburst. Eventually, unable to hold it back longer, his arm shot out, pointing at Smith.

"It's *him!*"

"What's him?"

"It's *his* fault!"

"Now, wait a minute, Duff," protested Smith. "Let's not start that crap again."

Smith and Duff glared at each

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other, suppressing boiling tempers. I drew Captain Wilkins to one side, inquiring about the station's current status.

Spieler, Captain Wilkins told me, had taken possession of the station personally, leading fifty men on board. Everyone from Mr. Merryweather to the President of the United States had been notified. The FBI was sending two men to the blockhouse. Government radar had picked up a new string of relay satellites between Earth and the *Merryweather Enterprize.* Apparently Spieler's specially fitted ship was the last relay station. He had assembled his men and focused the special ship's Gate on the *Merryweather Enterprize,* stepping through with them.

"Why aren't we sending anyone up from here?"

"Blocked."

"Blocked! How?"

"We don't know, Doctor. Something on the second ship is deflecting our focal point."

Our ground Gate was inoperative. I wondered about the Gate on the station. Jenson Gates work both ways. The *Merryweather Enterprize* had its own Gate more as a safety precaution than a necessity. The two gates were used in opposite directions to avoid complications and provide an emergency exit for the station when the ground Gate was focused elsewhere. I asked about the station Gate, thinking we could use it.

"We thought of that, too. The first leg, from the station to Zeta-one relay satellite is out. We don't know where the station Gate is focused. Possibly on the second ship. That would give them access to either one."

Duff and Smith were still wrangling, getting louder with each accusation and denial. The intensity of Duff's accusations made me think he knew about Smith and Sharon Norton.

"Listen, Duff," said Smith, his face visibly tired of arguing, "I'm going to say this once more. That's all. Once. So get it straight. I am *not* responsible for Spieler's actions. I am *not* his mother. This little plan, whatever it is, hatched in his brain before I even knew he existed. You're making it sound like *I* thought it up."

"You were hired to prevent it," shouted Duff. "So prevent it!"

Smith, stung, started around the table toward Duff. I remembered what Smith had done to Spieler's guards. Duff must have remembered something similar. He pointed at Smith, shouting to the two policemen.

"Stop him! Stop that man from hitting me!"

The two policemen moved toward Smith. I imagined them stretched out cold on the floor. They waited to see what Smith would do.

Smith, his face choleric, stomped

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toward Duff. Duff, frightened, backed to the wall. Smith's bony index finger came up, pointing at Duff's nose, an inch from it. He spoke quietly but firmly.

"Shut up."

"But—"

"Shut up."

"I—"

"If you do not shut up," said Smith, accenting each word by poking his index finger ever closer to Duff's nose, "I'm going to flatten your face."

I laughed. Smith turned on me, pointing. "*You,* too!"

"Me?"

"Everybody seems to think this is somehow *my* fault." He jerked his head at Duff. "*Him,* Horace, everyone!"

"I didn't say—"

"Then don't." He turned toward the door. "I'm going out for some air."

Smith left the room.

"What's eating him?" I asked.

Duff snorted. "Incompetent old man."

"Captain Wilkins," I said, starting for the door. "Would you step out here with me."

In the hall, I asked Wilkins to try to talk to Duff. We all had one job. It had nothing to do with fixing blame. We had to try to recover the *Merryweather Enterprize.* If the so-called leadership degenerated into chaos, what could we expect from anyone else. If necessary, he was to pull rank on Duff, pointing out who was captain of the station.

"I'll try."

"Good. I'll talk to Smith."

I pushed through the crowd. Several people asked me what was going on. I begged off. I found Smith outside, trying to light a cigar and cursing. I walked up behind him.

"Sulking?"

He spun around and leveled the cigar at me like a pointer. "Listen, buddy boy, I'm not letting any of you bastards dump this thing on me!"

"Who said we were?"

"You heard Duff!"

"Do you really care what he thinks?"

"And Horace. I can't get over it. You should have heard him on the phone. I've never seen him angry before."

Mr. Merryweather. That was it. Up to now, Mr. Merryweather was the one person who believed in Smith, totally and unequivocally, the one person whose opinion mattered to him. Mr. Merryweather's disapproval had shaken Smith. He lit the cigar. In the matchlight, I saw the deep wrinkles around his eyes. He looked momentarily old. An old man, out of his depth? The match went out.

"He's got a right to be mad," I said, trying to coax Smith from his pique. "It's his money."

Smith grunted.

"What did he say?"

"The same thing Duff said. I was

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hired to keep the damn cow in the barn and now it's gone. *I*, personally, single-handed, was supposed to stop the resources of Spieler Interstellar!"

"And you didn't."

He puffed his cigar, thinking. "No."

"Could you have prevented it?"

"Maybe." He pulled the cigar out of his mouth and flicked off the ash. "Maybe not. Either way, they're trying to stick me with the blame."

"Then I guess you'll have to do something about it. Unless you just plan to stand out here all night and lick your wounds."

Smith was silent several seconds. Finally he looked at me, his expression asking whether I had an idea. "Do what?"

"*I* don't know. I'm not the hero."

Smith winced, but said nothing. Finally he flicked away the cigar.

"Hero, huh," he said and smiled weakly.

"Do you have any ideas?"

"One."

"What's that?"

"Come on."

Smith started away from the blockhouse toward his car. I fell in step with him.

"Where are we going?"

"Do you have a gun?"

"No, and I don't want—"

"I've got an extra in the car."

Smith drove. I sat in the passenger seat, wondering why. Why was Smith leaving behind a brigade of police? Why was he leaving without telling anyone? Why was *I* doing the same thing? My misgivings multiplied when Smith reached in the glove compartment and came up with two .38 revolvers. He dropped one in my lap.

"Stow this someplace."

I stowed it back in the glove compartment. He retrieved it and returned it to my lap, glancing at me.

"You'll need it."

"I will?"

"Yes."

I looked at the .38. After some fumbling, I figured out how to push out the cylinder. The percussion caps of six cartridges stared at me. I closed the cylinder.

"There's a box of shells in the back seat. Stick a handful in your coat pocket."

"Smith."

"Hm-m-m?"

"Just who am I supposed to shoot with this thing, assuming I could hit anyone?"

"Let them shoot first."

"Who?"

"Spieler and company."

Smith caught the Newport Freeway toward Tustin. He was going to Spieler Space Operations.

"What," I asked, "are we doing?"

"If we can't go in the front door, we go in the back, right?"

"Go in the back! If we're going in the back, why don't we take the cavalry with us?"

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"Too much dust from the horses." He smiled, happy with his metaphor.

"What," I inquired, indicating the .38 in my lap, "if they scalp us?"

He eased into an exit lane. "Always a possibility."

"Shouldn't we at least *tell* someone?"

"They'd just screw things up."

"But charging into Spieler's back yard, guns blazing, won't."

He parked near the fence around Spieler Space Operations and shut off the lights. Apparently, he planned to enter under the fence again. He got out, stooping with the door open to look at me.

"Coming?"

"This is insane."

"Probably."

I reached into the back seat and scooped a handful of shells from the box. Smith lifted a satchel from the back seat, slinging it over his arm.

Finding the hole under the fence was more difficult at night. Down the slight slope from us, the compound was dark. Security lights shone weakly along the sides of the buildings. Smith found the hole and slid under.

"Pass me that bag."

I passed it under the fence. "Smith."

"Hm-m-m?" he answered, standing up with the bag in his hands. I talked to him through the fence.

"*This* time, tell me your plan. I feel like I'm following the scapegoat into the slaughterhouse."

He pointed into the compound. "You remember the building where we were this afternoon?"

"The computer center." Had it only been that afternoon? I was a burglar twice in one day. Smith was a bad influence.

"The building next to it is their Gate. It's probably focused on the first satellite in their string."

"So?"

"So it's the back door. If we charged up there with the police, they'd close it. This way, maybe we can get through before it slams."

"Get through! You mean I'm supposed to step into a totally man-made environment, surrounded by a vacuum"—I pulled the .38 from my waistband with two fingers, dangling it—"and start punching holes in it with *this* thing! You're nuts, Smith! You may be seventy-five and have most of your life behind you! You may not care about a few bugged eyes and exploded lungs, not to mention bulletholes! But *I'm* twenty-eight! I still have one or two good years left! I *care* about eyes and lungs! Especially my own!"

"And bulletholes."

"*And* bulletholes! You can just go on this little Kamikaze mission by yourself!"

"OK."

Smith turned away from the fence, staring down the slope. He

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walked quickly, the satchel swinging at his side.

"Smith!"

He kept walking. Somehow, I couldn't leave. I wanted to leave. Smith's so-called plan was the zaniest thing since Norton's body played Houdini. It would get him killed. If I went, it would get *me* killed. There I would be, famous, jotted down in a history book footnote, the man who assembled the first Stargate, dead on the day of his triumph, his body bloated by the vacuum of the very space he conquered. I saw myself perforated with as many holes as a practice golf ball.

What the hell? If you die at the peak of your success, you can't go downhill. I slid under the fence and followed Smith, noticing, as I caught up with him, that we were both going downhill.

"Change your mind?" he asked.

"No. It's still lunacy."

"Then why are you coming?"

"Kicks."

"You'll get plenty of those."

We neared the buildings. Smith's index finger went to his lips. We approached the corner of the Gate building. Smith glanced around the corner, then looked back at me, holding up two fingers.

"Two men," he whispered. "Ten yards. When I say 'go,' head for the small one."

Smith glanced around the corner again.

"Go."

I went. Smith led, leaping on the taller of the two guards. Somehow, I managed to collide with the smaller guard. He had both hands on his holster, working at the flap. I used my one good blow, a short left to his stomach. I expected him to collapse or at least bend double. He just staggered back, gasping for air. I grabbed him with both hands, trying to throw him to the ground. Either the man was an ex-acrobat or it is harder to throw someone than in the movies. He stepped and staggered and kept his balance, continuing to slap at his holster and gasp for air.

I tried my last tactic. I hugged him, pinning his arms to his sides and lifting him off the ground. My knees buckled. We sprawled. He kicked at me, hitting my leg. I heard an inrush of air as he caught his breath, preparing to yell. Something moved over us. The air burst from him in a harmless rasp. He lay still. Smith stood over him, the satchel dangling from his hand. Whatever was in it had left my opponent cold. Smith helped me up.

"I guess I didn't do that too well," I panted, beginning to feel the pain where the man's heel hit my thigh.

"You kept him busy."

"What's in that bag?"

"Plastique," whispered Smith.

"Plastique!"

"Shhh."

"Plastique," I whispered. "And you *hit* him with it! You could

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have blown his head off *and* ours!"

"It isn't nitroglycerin, you know."

"What are you going to do? Blow this place up?"

"Not if I don't have to."

We started into the building. An empty hall met us. We followed it past several closed doors. Smith stopped and listened at each.

"Smith."

"Hm-m-m?"

"You remember what happened the last time we did this. We wound up in jail."

"Don't worry," said Smith. "This time we're armed."

"That's what I'm afraid of."

The fourth door was open, light spilling on the hall floor. Smith held up his hand. I stopped. He eased up on the door, pulling out his .38 and indicating that I should do the same. He gave me a "here-goes" look and stepped into the room. I followed.

Only one man, his back to us, occupied the room. He heard us enter.

"Did you get the coffee, Tom?" he asked without looking around. There was something vaguely familiar about him.

"Nope," answered Smith.

The man turned. It was Grizzly.

"You!" said Grizzly—whether he meant me or Smith I don't know—and dived for an alarm button. He careened off a panel of equipment just as Smith reached him. The barrel of Smith's .38 clipped Grizzly's head. An earsplitting whooping shrieked from the public address system.

I heard people in the hall. Smith stepped over Grizzly to a set of elevator doors. They opened automatically before him.

"Come on!" he yelled over the deafening alarm.

I followed him into the elevator. As the door closed, men scrambled into the transmitter control-room, looking first at Grizzly, then at the closing doors. One man aimed and fired. Something thunked against the closing doors.

"We're trapped in here, Smith."

"Keep your fingers crossed."

"For what?"

"Hope none of them knows how to shut off the Gate."

"You're not going *through!*" I said. "Without a suit!"

He pointed at the elevator floor. "We can go back down there if you like."

The doors opened. Street lights from the City of Tustin winked through the shimmering air of the Gate field.

"Smith," I protested, peering over the edge. "What if they shut off the field just as we step toward it? It must be thirty feet down there!"

"Have you ever heard of the Great Leap Forward?" asked Smith.

"No."

"I'll tell you about it sometime. Now go!"

I looked at the field in front of

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me, reminiscent of hot air vapor. I had the eerie feeling I was about to step directly into hell. Satan, looking surprisingly like Spieler, would greet me. Either that or he would be grinning out at me from inside the *Merryweather Enterprize,* waving good-bye, while I floated toward Pluto, suitless.

Holding my breath, I stepped through.

XVI

When the deck of the *Merryweather Enterprize* touched my feet, I exhaled. Smith, blasé as a businessman stepping into Chicago, came through, fiddling with the strap on his satchel. He got it open and reached inside, withdrawing a timer.

"How long did it take us to get from Earth to here?" asked Smith, adjusting the timer.

"A little over a minute and a half, but if you're going to throw that through, don't add the minute and a half. Timers don't work when they're dematerialized."

Smith nodded and set the timer. "Two seconds."

"Smith—"

He pushed the timer and hurled the satchel down the corridor. I had a sudden vision of Grizzly cutting the Gate power, leaving us with Smith's plastique, activated and short-fused. The satchel hit the shimmering air and vanished. A second later, the shimmering air vanished.

"So much for the back door," said Smith.

"That," I said, looking at the spot where the Gate had been, "was *our* back door, too."

"Yep. Guess we'll have to open the front door."

"How?"

"From the inside, of course."

We had materialized in the workshop area of the space station, across the wheel from the control-room. It was the best location for Spieler. He could assemble his men with minimum resistance. We started around the circumference, compartment by compartment. Smith paused at one of the workroom doorways, examining it.

"Can we lock these?"

"Not from here."

"From where?"

"The control-room, or—" I hesitated, deciding how to tell Smith and avoid any impulsive response.

"Or what?"

"If a section is punctured, it automatically seals off, *but,*" I added quickly, "don't start blasting away. Even if you found a thin spot—and there are plenty of them—it would only seal one section, not all of them."

"What about the control-room?"

"What about it?"

"Will it seal?"

"Yes, but you'd kill everyone in there, even our people, if you punctured it."

"A drawback."

Smith thought, tugging on his

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lower lip and blowing out his cheeks. I began to get worried.

"I thought you had a plan."

"I do."

"What is it?"

"It doesn't cover this situation."

"Doesn't *cover* it! This is the heart of the problem!"

"Frankly, buddy boy, I didn't think we'd get this far."

Encouraged by Smith's meticulous preparation, I followed him. We moved from compartment to compartment, pausing at each doorway to glance in. I began to worry about Spieler. When the ground Gate failed, someone would notify him. He would be waiting for us at the other side of the wheel. I suggested the idea to Smith.

"Maybe," he answered, approaching another doorway. "Maybe not. If the plastique got most of their ground Gate, it probably took out their communications equipment. The only word Spieler could get would come from the relay ship. They would only know that the Gate had failed, not why. Grizzly probably had orders to destroy it if the police showed up. That's why I didn't want all those cops running around. One sight of a black and white car and there wouldn't have been any back door."

"You make this sound like some sort of last-ditch effort."

"It is."

Smith was right. No one boards a space station, captures its crew and jams its Gate—all in the spirit of healthy competition. Spieler had to be desperate. Yet, even in desperation, what could he gain? Dolores had suggested Spieler would gain time by a well-planned accident. An armed boarding party seemed a little obvious for an accident.

"What's Spieler going to get out of this?" I asked.

"Who knows?" said Smith. "We'll ask him when we see him."

Smith glanced into the next room, then jerked back from the doorway, waving for me to flank the other side. I heard footsteps approach. They stopped, then suddenly retreated. Smith stepped into the doorway, legs apart, arms fully extended, holding the .38 with both hands.

"Smith!" I shouted.

He fired once. The explosion reverberated against the metal walls.

"Missed him," said Smith.

"What in *hell's name* do you think you're doing?"

He looked at me, quizzical, bewildered. "He'll give the alarm."

"You can't just go around *shooting* people!"

"Why not?"

"First of all, you might puncture the hull."

"You said it would only seal off the section with the hole. The hole would have been in there." He nodded into the next room. "With him."

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"Second, you just about *murdered* him!"

"Murder?" He said it as if the word were new to him.

"Yes!"

Smith opened the cylinder on his .38, ejected the empty shell and replaced it with a fresh cartridge, glancing up to talk to me.

"Buddy boy, those men are committing more felonies than I can name. Kidnapping, burglary—"

"Burglary?"

"Sure, this is probably a building, legally speaking. Not to mention conspiracy and piracy and whatever else they're planning. You and I are citizens preventing a felony in progress. We are *not* murdering people."

"You're killing them, though."

"Nope."

"You *are!* I just saw—"

"You just saw me miss. That isn't killing anybody. I was aiming to wing him."

"Wing him! Kill him! It's all the same thing! It's the same fascist disregard for life that *they* have!"

Smith's face flushed, his expression so intense and hard it bordered on rage. He grabbed the front of my coat, slamming me against the bulkhead. His eyes, when he spoke, looked directly into mine.

"Listen, buddy boy, don't *ever* call me a fascist again! I've been fighting fascists all my life. Madmen and lunatics. They don't care *how* many bodies they walk over to get what they want!" He snorted contemptuously, releasing me and turning away. Relieved, I took a deep breath.

"Smith."

"What?" he snapped.

"You can't see it, can you?"

"See what?"

"You're using the same means they use."

He sneered at me, indicating the .38 with a jerk of his hand. "OK, I'll throw this away and we'll bludgeon Spieler to death with sweet reason."

I saw the point. Somewhere behind the lines, there is a reason why a war starts. On the front lines, there is just shooting, no reasons.

Smith led the way. We made it through two more workrooms before I heard the hiss and bump of the doors closing behind us, section by section. Spieler was sealing us off. I glanced back. One compartment away, a door closed. Crossing Burgess' office, the door ahead of us hissed and closed. Smith, leading, caught himself on the closed door.

"Can we open these things from here?"

"No."

"There's no manual override?"

"You have to have a hand winch."

Smith kicked the door once, cursing.

The phone screen in Burgess' office came on, a master intercom

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call. Spieler's face settled on the screen.

"Can he see us?" asked Smith.

"Not unless you touch on the phone. He's using the PA system."

"Whoever you are—" began Spieler, his expression impassive. Even his eyes seemed lifeless. It could have been the phone. He looked more haggard than when I had seen him at his club. "Give up. You have no hope either of escaping or interfering."

"Encouraging, isn't he," said Smith.

"We are systematically searching each section of this station. If you do not respond to this call, you will be shot on sight."

Smith shrugged. "I guess we'd better give the man a call." He touched on the phone, grinning at Spieler. "Hi, Fred."

Spieler blinked, startled, recognizing Smith.

"How's tricks?" said Smith.

Spieler looked past Smith. "Dr. Collins. Excellent." He leaned off camera, said something, then returned his attention to Smith.

"Are you armed, Smith?"

"Would you believe me if I said no?"

"No. Place your weapons on the desk in clear view of the phone. Then stand against the wall where I can see you."

Smith pulled the .38 from his coat pocket, laying it on the desk.

"*What,*" I asked, incredulous, "are you doing?"

"He's being sensible," interjected Spieler.

"Sensible! Smith—"

"Like the man says," said Smith, "put your gun on the table."

I followed orders, whether Spieler's or Smith's I didn't know. We backed to the wall, out of range of the phone mike. Spieler told us to put up our hands. We complied.

"Smith," I said, trying not to move my lips "you have a plan?" The last word sounded more like "hlan."

"No."

"No!"

"Shh."

"No. After that lecture you gave me on six-gun justice—"

"Something more important has come up."

"What?"

"Our necks."

The office door slid open. Three men with automatics stepped through. Three more waited outside. They led us through the station to a storeroom, the only rooms with manual locks, and pushed us inside, locking the door behind us.

Gradually, my eyes adjusted to the poor light. I heard something and glanced around at Smith.

He shrugged. "Not me."

I looked around the room. In an alcove between a set of storage lockers, a gray shape moaned on a cot. I walked to it. Under a blanket, his back to us, lay a man, doubled up and muffling his moans on a pillow.

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I squatted next to the cot, shaking the man's shoulder.

"Noooo!" he screamed. "I don't *want* to die!"

I rolled him onto his back. Staring at me, his face contorted with fear, one eye blackened and a large bruise on his cheekbone, was Dr. Higgins, Spieler's astronomer.

"I guess he found Spieler," said Smith, behind me.

"Noooo!" screamed Dr. Higgins at the mention of the name.

"We're not going to hurt you," I said, trying to sound reassuring.

Dr. Higgins looked at me, still frightened. After several seconds, his eyes showed recognition.

"You're," he said, hesitating, "one of those men."

"Yes. What's going on?"

"The Crab!" shouted Dr. Higgins. "Oh, God!" He buried his face in the pillow, his voice muffled but intelligible.

"I don't want to die!"

"Not that damn Crab again," said Smith, disgusted.

Dr. Higgins looked at him. "Yes. The Crab. You've got to *stop* him!"

"The Crab?"

"No. Mr. Spieler."

I smiled. Even beaten and terrified, Dr. Higgins said *Mr.* Spieler.

"It's no joke," snapped Higgins, noticing my smile. It faded.

Dr. Higgins looked from Smith to me and back to Smith, his face intensely serious. "He's insane, you know."

"We noticed," said Smith.

"I mean it, really insane, off his rocker, nuts."

"What's he going to do?"

"He's going to bring the Crab—" Dr. Higgins broke off, overcome with emotion. He beat the pillow, screaming that he didn't want to die. Eventually, he looked up. "Where was I?"

"The Crab."

"Oh, yes. He's going to bring *it* here."

Slowly, we pieced together Dr. Higgins' story. That afternoon, after Smith and I were hauled off to the police, Dr. Higgins tried to contact Spieler. He wanted another chance to explain the mistake, hoping to deter Spieler from uselessly sending out a drone ship. The Crab Nebula was the wrong target. When he finally reached Spieler, it was six-thirty. Spieler and fifty men, men Dr. Higgins had never seen before, were in the Space Operations Gate building. Waiting to talk to Spieler, Dr. Higgins heard several conversations, people speculating about the expression on "old Merryweather's face" when they did whatever it was they were about to do. It puzzled him.

He found Spieler and began explaining the error. Spieler nodded, listening, reassuring Dr. Higgins. Everything was fine, said Spieler. Halfway through the explanation, Dr. Higgins realized the coordinates would never fit into a drone ship computer. He remembered the conversations about Merryweather.

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He guessed at part of the truth and confronted Spieler with it. The men were going to take the *Merryweather Enterprize*. Once secure, Spieler was going to reach out to the Crab Nebula with the Big Gate.

"I asked him why," said Dr. Higgins. "He just smiled and said he had his reasons. But he doesn't! He's insane! Loony! Let *him* die! *I* don't care! But *I* don't want to die!" He became incoherent and blubbered into the pillow.

The door behind us opened. Spieler stood in the doorway, flanked by two armed men.

"Dr. Collins," said Spieler, nodding at me. "And the infamous Scarlyn Smith." He stepped inside, leaving his henchmen in the corridor. They watched us through the doorway, alert, automatics ready. "I've been doing some homework on you, Smith. Yet, I'm still surprised to see you."

"That was the general idea."

Spieler laughed, a cold and unsympathetic laugh. Before he could continue, Dr. Higgins darted between Smith and me. He stopped in front of Spieler, his face plaintive, hands clasped, suppliant.

"Sir, you cannot go through with this!" shouted Dr. Higgins. "We will *all* be killed! And sir, we will *die* from that!"

Spieler sneered at him.

"Please, sir—"

The back of Spieler's clenched fist came across Dr. Higgins' face. I flinched, starting to go to Dr. Higgins' aid but stopping when the muzzles of the two automatics in the hall turned on me. Dr. Higgins reeled to one side, breaking his fall against the bulkhead. Smith never moved.

Spieler returned his attention to Smith. "I told you I would win, Smith."

"You've got a space station. So what?"

"Not only the station," said Spieler. "The Big Gate."

"Big deal."

Smith's tone, that of a parent unimpressed with its child's achievement, struck me as dangerous. I was impressed. Spieler could kill us at any moment. If Smith persisted, the child in Spieler might become angry, strike out at the parent in Smith.

When Spieler smiled, amused at Smith's attitude, I relaxed a little, a very little.

"Do you know what winning is, Smith?"

"Frankly," said Smith. "I don't have time to discuss it right now." He indicated Dr. Higgins, who was touching his bleeding lower lip with his fingers and looking at them. "There are others who need my attention."

Spieler's face clouded over. "You are going to listen to this, whether you want to or not."

"All right," said Smith, exasperated, crossing both arms on his chest. "Let's have it. The sooner you tell me your little thoughts on

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winning, the sooner I can pay attention to something important."

Spieler's mouth had drawn tight. He started to speak, but Smith interrupted, impatient.

"Come on, Freddy. Hurry up."

Spieler's index finger came up, pointing at Smith, jabbing the air to accent the words. "I have known people like you all my life! I—"

"I'll bet you have," said Smith, bored. "First, there was Wilber and Martha . . ." It took me a moment to remember Spieler's parents. "Then who else? Teachers? Coaches? Professors? But you made them listen, didn't you?"

"*Yes,*" shouted Spieler. "*I* made them *listen!* All of them!"

"Freddy Spieler," said Smith, contempt in his voice. "The big winner. Chalked up more points than anyone at a dollar a point, a dollar a pat on the head. Money is the way we keep score, isn't it, Freddy? High scores are good. High scorers are good. Freddy Spieler is a good boy."

"Shut up, Smith."

"Let's talk about winning some more. I hate to discuss it in front of Robert here. He's so innocent . . ."

"Me?" I said.

". . . but it can't be helped. After a while, you didn't need their opinion any more. After all, who were they? Teachers, parents—low scorers. You thought of yourself as the independent man, testing himself against himself. Never flinch from your tests. Isn't that Nietzsche? The superior man knows how to accept those tests. But Nietzsche also said the superior man knows how to conserve himself, to survive, and you'll never survive, Freddy." Smith waved his arm around the room, indicating Dr. Higgins and me. "It doesn't matter what happens to us . . ."

"Smith," I said, trying to interrupt. That kind of loose talk seemed unnecessary to me.

"It doesn't matter what happens to anyone. But to win, you have to be free enough to survive. All this dragging poor old Nietzsche and old Machiavelli onto the scene just covers up Freddy Spieler. The will to power," mocked Smith. "Little Freddy's just upset because Horace Merryweather has pulled the rug out from under him and won't let him play anymore, so he's taking his marbles and going home. If *you* can't play, *no* one can."

Spieler glared at Smith, then turned on his heels and left. In the corridor, he spoke to the guards, loud enough for us to hear.

"Kill them."

Kill them. I started to swallow. The lump in my throat refused to let me finish. Smith had definitely gone too far. Psychoanalyzing a madman might have its advantages to society, but psychoanalyzing an armed madman was the mad leading the mad.

Smith leaned over to me. "Don't say I didn't *try* to reason with him."

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"Reason! You call that reason! Scolding him! 'You've been a bad boy, Freddy!' Why, Smith? What was the point of—" My sentence dribbled to a halt. The two guards, one of them so large his automatic seemed dwarfed in his grip, entered.

"The point is," whispered Smith, "that now there's only two of them."

"Shut up and get over there," snapped the smaller gunman, indicating the bulkhead with a flick of his pistol.

"Noooo!" wailed Dr. Higgins.

The big one started to lumber toward Dr. Higgins. I never saw it happen. One minute he lumbered. The next minute he slumbered, supine, out cold. Smith already had the second man's gun arm. He stepped inside, twisting the gun arm away from himself, ducked under the man's armpit, and threw him. The man spilled on his back, gun flying. He started to get up, looking around for his missing gun. I stomped on his stomach, somehow tripping and falling. When I looked up, the man was unconscious. I got to my feet.

"I didn't think it would do that," I said.

"What?" asked Smith.

"I didn't think it would knock someone out, stepping on his stomach."

"It didn't," answered Smith, pointing to Dr. Higgins.

Dr. Higgins, embarrassed, stood behind the man, holding the missing automatic like a hammer.

"Oh."

XVII

"Next time," said Smith, looking at the man on the floor, "Don't kick him in the stomach. There are too many things he can do to counter it."

"Like what?"

He prodded the man on the floor with his foot. "Like what he did."

"What did he do? I tripped. That's all."

Smith smiled, tolerant. "It did happen pretty fast." He turned to Dr. Higgins. "Tell me Freddy's plan."

Dr. Higgins, slurring his words around his swelling lip, launched into his suppositions, pieced together over the last few hours. The longer I listened, the more impressed I got, both with Dr. Higgins' deductions about Spieler's plan and with Smith's insights into Spieler's character. Spieler had to be paranoid. No other explanation fit. Spieler not only wanted to take *his* marbles and go home, he wanted to take *everyone's* marbles. If he couldn't have them, no one could. Or, to phrase it more accurately, if Spieler lost his marbles, everyone would.

"I don't believe it," I protested, overwhelmed by Dr. Higgins' ideas.

"It's true, Cluggins. I assure you."

Spieler had no intention of going

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through the Big Gate. He planned to use it exactly as I had used it that morning, with one exception. Instead of ripping up a fifteen-kilometer dirt clod, he wanted to pull a pulsar into the Solar System.

The idea staggered me. I tried to imagine it. A super-massive star spins, gravity and centrifugal force tenuously balancing against each other. Spinning, it loses energy. It contracts to compensate for the loss, growing brighter—a wet ice-skater, tucking in her arms, spinning ever faster on the point of her skate, spewing water.

When enough energy radiates from it, its center collapses under its own weight, a neutron star, its electrons and protons mashed together.

"How large is it?" I asked.

"This one is ten kilometers across."

A star, once larger than the Sun, now compressed to ten kilometers.

"What would happen," asked Smith, "if he succeeds?"

Dr. Higgins thought a moment, looking past us at the vacant air, listing the possibilities in his mind. He nodded vaguely, mumbling "yes," and "ahh," and "after that . . . yes." His thoughts sorted, he looked at us.

"Take your pick. The Sun and the pulsar might form a double star, or the Sun could just accelerate, leaving Mars and Earth and some of the less significant planets to orbit the pulsar and be bombarded—amidst electromagnetic chaos—with massive doses of everything from X-rays to protons, or the Sun and the pulsar could crash into each other and the Sun itself could nova and the remaining glob could form a second neutron star and then lose even more energy and collapse even further until it was so small and so dense that the Swarzschild radius is passed and its gravity is so great even light can't escape it and a black hole—imagine it, a black hole!—forms. Of course we're long gone by this time. Everything in this general vicinity is long gone. In spite of that, it's still magnificent! What an event! One *hell* of an event!" Dr. Higgins looked at me, beaming, as if he had just discovered the Moon. "If we *were* here, Cluggins, and *did* get sucked into the black hole, there are people who think it would throw us into another universe. Imagine it! Another *uni*verse! It's beyond imagination!"

"If only Spieler's parents," said Smith, "had paid more attention to him."

"In any case," concluded Dr. Higgins, calming down. "Your guess is as good as mine."

I nodded, but refrained from guessing. Could Spieler do it? The Big Gate, thanks to Parry's help with the reactor, had potential far beyond Norton's original design. But moving the mass of a star, even one only ten kilometers across—I didn't know.

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"Dr. Higgins," I said, "what about the mass?"

"What about it?"

"A collapsed star is not just another hunk of dirt."

"True. So what?"

"What's the essential difference between the two?"

"The neutron star's packed tighter."

I shook my head from side to side. "Nothing else?"

"Not much. Matter's matter, as they say. This is not, you know, antimatter. It still has to obey the law, so to speak."

"Can it be moved?"

"Of course it can be moved. *Any*thing can be moved. Fulcrums and a place to stand won't do it, but given enough power and the right equipment—" Dr. Higgins reached into his coat pocket and withdrew a notebook and pencil. "You seem to know something about this Gate."

I nodded.

"Tell me the maximum power output of the reactor Merryweather's using and I'll tell you if they can do it."

"The maximum," I said, my voice flat.

"Yes," said Dr. Higgins, waiting, pencil poised on the notebook.

I had a sudden vision of Hilda, the Merryweather computer technician, her Pekingese face in pain at the prospect of rerunning a program.

"I—"

Dr. Higgins looked up from the notebook, eyebrows raised. "Yes?"

"I—"

Smith looked at me. "Well?"

"I don't know."

"You're a big help," said Smith, contemptuous.

"If I had a computer," I pleaded, my voice shaky, "and a few hours—"

"You don't."

Dr. Higgins closed his notebook. "Well, there you are. If they have the power, they can do it. Matter is matter."

"You're sure about that," said Smith, already pacing the room, thinking.

"Reasonably."

Smith paced, weighing the possibilities in his mind, looking up at Dr. Higgins and me every few passes and shaking his head.

"We've got to assume," said Smith on one pass, "they can do it."

"Why?"

"If we assume anything else, and we're wrong, the consequences are too great."

The neat map of the Solar System, left in my mind from a high school science class, crumpled. "I see what you mean."

During each traverse of the room, Smith stepped over the two unconscious men. Then, approaching the smaller one, he paused, foot in the air, looking at one of them. He lowered his foot to the deck.

"I wonder if *he* knows."

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I laughed. "That guy wouldn't know a meson from his mother."

"No, I mean Spieler's plan. I wonder if he knows what it means."

"I doubt it. He probably just collects his pay and lets other people worry about policy."

"Policy," said Smith, thinking. He looked at me. "Is there any other access to the PA system?"

"Sure. Every phone has a 'General Station' button for emergencies."

Smith nodded. "Good. This qualifies."

We locked the two gunmen in the storeroom, taking their guns with us, and started back toward Burgess' office, Smith leading.

"What's he doing?" asked Dr. Higgins.

"Beats me."

Smith sat down at Burgess' desk and touched the General Station plate. His own face, repeated on phones throughout the station, appeared on the screen.

"Attention, everyone on the *Merryweather Enterprize*. Frederick Spieler has deceived you. He is attempting to destroy everyone on this space station. Contrary to what you have been told, this is not simply an intercorporate struggle. I have with me Dr. Higgins, the astronomer for Spieler Interstellar." Smith motioned for Dr. Higgins to take the chair behind the desk. "He will explain what is happening."

I expected Dr. Higgins to get on camera and begin his "Matter is Matter" speech, larding it so heavily with technical language that Spieler's men would think it was an educational program and refuse to listen. I underestimated him. Succinctly and simply, even with occasional touches of grim wit, he began telling them what Spieler intended.

Smith satisfied himself of Dr. Higgins' showmanship, then started back toward the control-room, trotting. The station's "gravity," generated automatically by the rotation of the great wheel, was slightly less than Earth's, helping our progress.

"Do you think," I asked, loping next to Smith, "they'll believe Higgins?"

Smith gave something like a running shrug. "They can't all be as suicidal as Freddy."

We passed an observation alcove. Smith stopped and backtracked, walking up to the port and peering into space.

"Where are those two ships of Freddy's from here?"

"Depends. Let me look. They may be out of view."

Smith moved aside. I could see the Big Gate's focusing ring, button-sized, below me. What must have been two or three hundred kilometers from it, the "Collins" asteroid stood, waiting for our mining crews. Between them, only detectable because of their position in relation to the Sun, two space-

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craft, easily mistaken for faint stars, gleamed. I pointed.

"There they are, between the Gate and the rock."

Smith looked, squinting and shaking his head. "Too far. I can't see them. Eyes aren't as good as they used to be."

"The two bright specks."

"No good. You watch them," said Smith. "If either one moves in the next ten minutes, come to the control-room."

"Otherwise?"

"Otherwise—" Smith smiled, a broad ironic smile. "Frankly, buddy boy, I don't think there is any otherwise."

He started down the corridor.

"Smith," I shouted. "Where are you going?"

"Control-room."

I looked out the port. Neither ship had moved. I stared at the two faint points of light. Once I thought they moved, but I noticed everything had moved and realized it was my eyes. I blinked and moved back from the port, aligning the Gate with the edge of the port for perspective. I wondered why Smith left me behind. On our first visit to the *Merryweather Enterprize,* Smith had been able to see constructors near the focusing ring. Constructors were smaller than spacecraft. Heroics? Possibly. If one or both of the ships moved, it meant Spieler's men believed Dr. Higgins and fled. At that point, it would be possible to stop Spieler. Smith would need help. If nothing moved, Spieler could not be stopped. Smith was giving me a few extra minutes to live.

I tried to think about the situation, watching the two spacecraft. Spieler would have re-established matter transmitter contact with the relay ship. His men could take either ship or both. Presumably, the equipment deflecting the Merryweather ground Gate was in the relay ship. The men would take the station's Gate to the second ship, leaving the deflection equipment in operation to hinder pursuit.

Something moved. I stared out the port. Imagination? I squinted at the spacecraft.

Somewhere farther down the corridor, I heard a shot, loud and reverberating. Several more shots followed. I checked the automatic, familiarizing myself with it. Would I shoot anyone? I didn't want to. In self-defense? If they shot first?

I checked the port again. One ship had disappeared, breaking out of solar orbit and changing its angle to the Sun, its reflection gone. I started for the station control-room.

I expected noise. I heard none, only my own footsteps on the deck. Ahead of me, the control-room door was open. I stopped, checking the gun again.

"Smith?" I called.

No one answered. I shivered, realizing what I had just done. If Smith were safely in the control-

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room, calling was unnecessary. Otherwise, it warned Spieler.

I moved up to the door, wondering what I was doing there, a cocked automatic in my hand, about to step into a room where I might have to use it. I wiped my forehead with my sleeve. I remember being surprised at how much I was sweating. My stomach felt knotted. I kept thinking, *You're an engineer, Collins.* It buzzed in my head. *Engineer. Smith should take care of this. Smith, not you.* My bowels wanted to move.

"Smith?" I called again, almost involuntarily.

No one responded.

I pointed the gun ahead of me and stepped through the doorway.

Spieler stood at the Big Gate controls, his left shirtsleeve drenched with blood and his left arm dangling, limp and useless, at his side. He looked at me, trying to steady himself on the control panel. His face was blanched and slack. In spite of the physical shock to his body, his eyes were alive. He began fumbling with the unfamiliar safety on the first switch for the Big Gate. He got it up and touched the plate. The "Power" light glowed green.

I hesitated, unable to decide whether to say something or shoot. I looked around the control-room. On the raised area in front of the main observation wall, the air shimmered. The matter transmitter in the relay ship was focused on the control-room. Did Spieler think he could escape, drag a pulsar into the Solar System and escape? Or was it a door to the relay ship in case he failed?

On the floor, partly obscured by Captain Wilkins' desk, a standup table like an old-style drafting board, lay Smith, motionless, blood glistening on the deck along his left side.

I moved toward him, dazed.

When I moved, Spieler flicked up the second safety cover and touched the plate. The "Focus" switch lit amber. I turned on him. He freed the automatic from his belt, leveling it at me and leaning against the control panel.

In spite of the gun in my hand, I expected Spieler to fire. A Mexican standoff is no standoff at all when one side is insane. I could see he was struggling to keep erect. Watching him, I realized why I was still alive. Spieler knew I would get off at least one shot. He could not absorb more damage and still activate the transmitter.

"Move away from the panel," I said.

Talking was a mistake. My voice, unexpectedly reedy, reflected my frightened state of mind. Instead of moving, Spieler seemed to gain confidence.

In the corner of my eye, something moved. I thought at first Spieler might have an accomplice, stepping through from the relay ship. I changed position to take in

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as much of the room as possible—Spieler, the shimmering air from the relay ship's matter transmitter, Smith's body. The body moved.

"Smith."

Spieler looked at Smith. Smith, struggling to regain consciousness, rolled slowly onto his own blood.

"Smith!" I shouted. "What should I do?"

Smith lifted his head a few inches from the deck, his cheek smeared with blood, looking first at me, then at Spieler. His head dropped back to the deck, the face away from me.

Spieler started to fumble with the last safety cover, awkwardly trying to raise it and hold onto his gun.

"Smith! Please! What should I do?"

Groggily, Smith turned his face toward me, his voice weak and barely audible.

"Shoot the bastard."

Spieler looked at me, hesitating.

I tried. I held the automatic with both hands, raising it to eye level. My arms shook. I could see Spieler's face over the front sight and imagine it blown away. Spieler's face, watching me with almost scientific detachment, and the front sight and what I was about to do seemed the only reality. Everything else seemed abstract and unreal. A pulsar, thousands of light-years from Earth, about to topple the Solar System like bowling pins, about to extinguish the human race—the enormity of it drained it of meaning. I only knew one thing. I was about to kill a man.

"Shoot, damn it," groaned Smith.

A smile, twisted and contemptuous, appeared on Spieler's face. He turned away from me to the control panel. I tried to fire. I couldn't. I felt the gun drop from my hands and heard it clatter to the deck. I saw Smith reach out for it and lose consciousness. I saw Spieler lift the last safety cover and touch the plate. The "Activate" light came on, red beneath his fingers. Ignoring me, he lurched toward the focal point for the relay ship transmitter. Even then, I could have stopped him. If I had rushed him, he might have missed with his first shot. Somehow, it seemed futile.

Spieler stepped through the circle, disappearing.

Still dazed, I stooped over Smith. He was unconscious. I rolled him on his back and tried to examine his wounds. Amidst the blood and torn cloth, I could see a rib. I tried to stop the bleeding.

While I worked on Smith, Dr. Higgins came in, asking what happened. I tried to explain. I started to indicate the place where Spieler stepped through to his ship. It was gone, shut down just after Spieler used it. Dr. Higgins listened, visibly more upset each minute.

"Can't we *do* anything?" he asked.

"What?"

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"*Any*thing! Can't we shut it off or something?"

"No. Once anything is in the field, safety circuits prevent anyone turning it off until the field's cleared."

"What kind of safety is that?" raged Dr. Higgins. "It's going to kill us all!"

"Sorry."

"Sorry! Is that all you can say? Who built this damn Frankenstein anyway?"

I told him. He looked at me, startled, incredulous.

"*You!*"

I nodded.

"Then *un*build it! Take it apart! Shut it off! *Do* something!"

I tried to think of something feasible. Even if we destroyed the reactor, enough residual energy would remain in the field to complete the transmission. All Gates are constructed that way.

"We could destroy the focusing ring," I suggested.

"How?" asked Dr. Higgins, game.

"Good question."

Even if we somehow moved the *Merryweather Enterprize* near the focusing ring and pulled all the stops on the reactor, the explosion would not damage the ring. The *Merryweather Enterprize* was a half mile across. The ring was a hundred and eighty kilometers across. Any explosion we could produce would only slap the giant's face. I told Dr. Higgins. He cursed, thought a moment, running his tongue over his swollen lip, then got an idea. It excited him. He clapped his hands together, saying "yes, yes," thinking about it, assembling the pieces.

"What is it?"

He waved me aside, thinking. "Just a minute."

"Please, Dr. Higgins. We don't have much time."

He shook his head violently. "Got it. Got it."

"What?"

"Can you maneuver this station?"

"No."

"If we got someone on Earth to tell you how, could you?"

"Maybe."

"OK, listen to this."

"I'm listening."

"We maneuver the station up to the Gate. Got it?"

"Yes."

"Then we put it in this end of the transmitter."

"Then what?"

"We ram it!" He clapped his hands. "Like two trains in a tunnel!"

"Ram it!" In spite of the seriousness of the situation, I laughed. The idea was utterly ridiculous. Assuming the pulsar was not in transit but simply sitting in space, ramming it would be about as effective as ramming the Sun. Second, I reminded Dr. Higgins, since the long reach of the Big Gate is based on the idea, among others, that the beginning and end of the journey are

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the same event seen from different perspectives, the space station and the pulsar would never even touch. Starting at different spatial positions and different points in time, they would be different events. Dr. Higgins waved me into silence, his brow deeply furrowed, contrite.

"OK, OK, I remember now. It was just a suggestion."

"A strange one for an astronomer."

He glared at me. "*We* make mistakes, too, you know!"

"I know, but—"

"Let's not pursue it further. I remember it all now. I even explained it to Mr. Spieler once, though why he wanted to know is beyond—"

"Spieler! You explained—" I broke off and ran to the observation wall. I could see nothing of the second spacecraft. I went back to the Big Gate control panel, touching a series of plates. A bank of screens lit up.

"What's that?" asked Dr. Higgins.

"Remote cameras to watch the Big Gate." I scrutinized them closely, pointing at the screen. "There."

Dr. Higgins looked. "What is it?"

"Spieler's spacecraft, heading for the focusing ring."

We watched the screen. Spieler's ship approached the center of the focusing ring, perceptibly moving even at the distance of our camera. I should have thought of it. Spieler planned to trade places with the pulsar. Since it would be gone from the focal point of the Big Gate, he could safely enter that space, leaving the Solar System *before* the pulsar materialized. The "Power" readout was off the scale. The "Duration" readout showed slightly under ten minutes to materialization. Smith groaned behind us.

I left Dr. Higgins at the screens and went back to Smith. Blood had soaked through my makeshift bandages. Someplace, the station had first-aid equipment. I had never seen it. Under the circumstances, first-aid would probably be last-aid. I tried to make him comfortable. I had to lean close to his mouth to hear him.

"What happened?"

"I told him. He listened, eyes barely open. When I finished, he made a noise, indicating he had understood, then said something. I bent closer.

"Why didn't you shoot?"

"I couldn't."

"Stupid bastard."

He lost consciousness again.

I went to the phone and tried to contact the Merryweather ground Gate. Spieler's ship was still jamming communications. Somewhere in the process, the situation became a reality. Spieler would keep jamming the equipment until his ship disappeared through the focusing ring. Then? There wouldn't be any then. *Why didn't you shoot? I*

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couldn't. Civilized, Collins. Very civilized.

I walked back to Dr. Higgins. He pointed at the screen. Spieler approached the bull's-eye. What Spieler hoped to do six thousand light-years from Earth, other than outlive humanity, I didn't know. Perhaps he had one of his girlfriends aboard his ship. Adam and Eve. It was the funniest thing I had ever heard. Tears came to my eyes. Dr. Higgins looked at me.

"What's so funny?"

I couldn't stop laughing. I pointed at the screen.

"That's not funny at all," said Dr. Higgins, frowning.

"Adam," I said and dissolved, laughing.

"Adam?"

"I always thought," I said, starting to hiccup, "Adam was a little crazy."

Dr. Higgins looked at the screen. "He wasn't the only one."

Spieler's ship disappeared. Wiping the tears from my cheeks, I looked at the "Duration" readout. X minus thirty seconds. My hiccups subsided. Not even enough time to call the ground. I walked to the observation wall. Below me, the focusing ring looked small and harmless. How would it start? Would the pulsar materialize as the rock had materialized, then suck us slowly to it? Would it appear, then nothing—gone in a split second?

I started to ask Dr. Higgins. He stood intently watching the screens. Why burden him with useless questions. I glanced at Smith, unconscious on the floor. At least Smith had known why he was going to die. On Earth, they would never know. I looked at my watch. X minus three seconds. What can you think in three seconds? I stared out into space, watching the focusing ring. Enjoy the ride, Collins.

I glanced at my watch again. X plus three seconds. My watch needed cleaning. The thought almost started me laughing again. X plus thirty seconds. I looked over my shoulder.

"Dr. Higgins."

"What?" he snapped, irritated at having his attention taken from the screens.

"What does that readout by your hand say?"

He looked at it. "Zero."

"Impossible."

"Look for yourself."

I walked over to the control panel. "Duration" zero. Plain as day. In fact, six zeros. I looked at the "Power" readout. Minimum load. I looked at the screens. The focusing ring hung in space. I examined the background of stars. Nothing. Or rather, something. Stars. Small stars. No big ones up close.

"I don't understand," I said.

"You don't understand what?"

"We're supposed to be dead now."

"Maybe we are," suggested Dr. Higgins.

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I looked around. I had heard of snowballs in hell, but not space stations. "No, I don't think so."

Dr. Higgins pinched himself. "I feel like I'm here."

"Take my word for it," I said. "You're here." I mused, dumbfounded. "You're here and I'm here and Smith's here, but the pulsar isn't."

I heard clattering footsteps in the corridor. Corona del Mar had reestablished matter transmitter contact with the station. I reached over and touched the "Power" plate. The light remained on. Spieler was still in the field. The instruments, designed to register objects considerably larger than a spacecraft, barely noticed his presence.

Captain Wilkins and a half dozen men charged into the control-room. Captain Wilkins came to an abrupt halt, staring at me.

"You!"

What could I say to that? I grinned. "None other."

XVIII

Dolores and I visited Smith in the hospital. Emerging from the elevator on Smith's floor, I felt like turning around and leaving. As soon as the doors opened, I saw H. Winton Tuttle pacing the corridor outside Smith's room, a deep frown on his face. I would have to pass him to see Smith.

"What's the matter with you?" asked Dolores.

"That's Harold."

Harold saw me. Retreat, as they say, became impossible. He stopped pacing. He glanced at a gray-haired woman on a bench next to the wall, pointing down the corridor at me. His pointing finger quivered.

"That's *him!*"

"Who, dear?" asked the woman. In a softened, middle-aged way, she faintly resembled Smith.

"*Collins!* He's responsible for this!"

I introduced Dolores to Harold and his wife. Meeting Smith's daughter was an odd experience. I thought of her as belonging to the generation ahead of me. I thought of her father, Smith, as my peer.

Reluctantly, Harold shook hands with Dolores, grumbling. There would be litigation, he assured me, substantial litigation over this matter.

"What matter?" I asked, wanting Dolores to hear his complaints and evaluate them.

Harold put both palms to his forehead, as if losing patience with an obstinate child. He looked at his wife, shaking his head in disbelief.

"Did you *hear* him, Janet? He asks *what* matter! First he convinces poor Scarlyn to ride off like Don Quixote—and just as blindly! Then he gets Scarlyn shot to pieces and from what the media say almost wipes out the human race! Then he alienates Julia from us! And he wants to know *what* matter! I tell you—"

"Julia?"

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"Our daughter," said Janet Tuttle.

"I know. What's she got to do with—"

"*You*, and Scarlyn, and"—he pointed in a generally northern direction—"that so-called school up there—"

"Berkeley?"

"Yes! All of you are combining to *corrupt* my daughter! She no longer listens to me! She listens only to that crazy old—old—" He waved his hand at Smith's door, unable to find the right pejorative. "To *him!*"

"She could do worse."

Harold's eyes narrowed, suspicious. "Where did *you* go to school?"

"Berkeley."

"Ah-ha! I thought so! You, Scarlyn, Julia—they should tear that place down stone by stone and salt the earth!"

"How's Mr. Smith?" Dolores asked Janet Tuttle.

"Weak, but recovering. They say he has a very sound constitution."

Harold snorted, beginning a philippic against doctors. They knew nothing, nothing at all. Appearances were deceiving. Inside, a man Smith's age was worn out, finished. The doctors only took him off the critical list because there was nothing more they could do.

"Frankly," I said, "I don't think you should let Scarlyn hear you say that."

"Why?"

"He's liable to get up off what you seem to think is his deathbed and kick the hell out of you."

A nurse came out of Smith's room. I introduced myself.

"Ah, yes. Mr. Collins. You may go right in. Don't stay too long. He's still weak."

Harold looked startled, frowning at the nurse. "*They* can go in?"

"Yes, sir."

"But *we* can't?"

"I'm sorry, sir. Mr. Smith left strict orders and his doctor agrees."

Dolores and I left Harold arguing with the nurse.

Smith, propped up in bed, looked weak but alert, his complexion pale. A stack of magazine tapes stood on the table next to his bed. He looked up from the viewer, glad to see us.

"And you brought Gladstone with you," he said.

"I had to. Harold's threatening to sue."

"What for?"

"I don't think he knows yet. How are you feeling?"

"Better, they tell me. The worst of it was over before I woke up." He patted his side lightly. "Plastic rib in here."

We sat down on chairs next to his bed, talking a few minutes about his health. Something other than his convalescence seemed to be bothering him. I had a suspicion what it was. He seemed reluctant to bring it up with Dolores present. I assured him she knew everything

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that happened on the *Merryweather Enterprize.*

"*I* don't," said Smith.

"What do you want to know?"

"First, why didn't you shoot Spieler?"

"I tried."

"You tried, but you didn't."

"I couldn't." I thought about it, remembering that moment in the control-room. "I kept thinking, you're about to kill a man, Collins. Everything else seemed sort of abstract, unreal. I couldn't justify killing for that abstract a reason."

"Humanity *is* a pretty abstract idea."

"Maybe if he'd shot at me—" I shrugged. "Who knows?" I didn't like saying my next thought. "Maybe I'm a coward."

"No. A coward would have turned back a dozen times before he ever got to that control-room. It's just the way you're built. Some people can and some people can't. I should have seen it coming, but I was too concerned about Freddy's mind to worry about yours."

"Seen what coming?"

"All that moral crap. I should have known when you started worrying about the moral implications of the Gate."

"Someone has to worry about that kind of crap, as you call it."

"True." He nodded at Dolores. "Lawyers, maybe. Preachers. Me—I get paid, I work."

Watching him, it struck me. I had seen Smith play the old man. I had seen him play the demented old man. What was he playing now? Tough guy? Hero? Forget all that moral crap, Louie, and fire the machinegun. I laughed.

"Totally mercenary, huh? You never worry about little things like who's right and who's wrong."

"It'll give you gray hair."

"You've already got gray hair."

"I got it learning not to worry."

A better way of putting it occurred to me. "Suppose Spieler had offered you the job instead of Mr. Merryweather. Would you have taken it, knowing what you know now?"

Smith's mercenary pose broke. He laughed, then held his side. "Hurts. OK, you win. What are you going to do now?"

Dolores beamed, answering before I could say anything. "Get married."

Smith eyed me. "I suppose he'll do."

Dolores hugged my upper arm. "He'll do just fine."

"Then what?" asked Smith.

"Mr. Merryweather wants me to build three more Big Gates."

We talked a few more minutes. Smith began to look tired. I suggested we leave and stood up.

"By the way," said Smith, "there's one detail that's escaped me, a minor point but—" He hesitated, wanting to draw me out.

"What is it?"

"Why," he asked, reaching over and pulling a cigar from the cabi-

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net next to his bed, "wasn't the Solar System destroyed?"

It had taken Burgess, Steichen and I five hours and a computer to clean up that detail. The Gate, intended for planetary mineral extraction and designed to reach through a planetary magnetic field, could work perfectly in a planetary environment. Given enough power, it could bore a fifteen-kilometer hole through a planet. The pulsar provided a radically different electromagnetic environment.

The magnetic field of Earth, and coincidentally the Sun, is one gauss at the surface, one line of magnetic force per square centimeter of surface. The Crab Nebula's neutron star, ten kilometers of shrunken sun, has a surface magnetic field of ten billion gauss. When our Gate reached out, its focal point on the pulsar's surface, the intense magnetic field acted exactly like a second focusing ring, tightening the focus. Because of the added power, we removed a chunk of the pulsar with almost twice the mass of our planetary sample–twice the mass and less than a centimeter across. Impressive objects, pulsars. I hesitated telling Smith. I felt like needling his pose of the uninvolved mercenary.

"You don't really care about details like that, do you?" I asked. "You got your pay."

"True, but my granddaughter asked when she called. I told her I'd find out. One of the professors at Berkeley–old gaffer, Emeritus, I think–wanted to know."

"Not Jenson."

Smith snapped his fingers, grinning. "That was the name. Slipped my mind. He thinks you didn't build the Gate properly. I'd like to know why we're still here for his benefit."

When I finished, he nodded, pensive, chewing on his unlit cigar.

"What happened to Spieler?"

Spieler, intending to trade places with the pulsar–to arrive safely in the space it vacated–arrived instead at its surface. The titanic forces at the surface, sufficient to squeeze the Big Gate's focus from fifteen kilometers to less than button-hole size, had applied themselves to his spacecraft.

I held up my thumb and index finger, spacing them a fraction of an inch apart.

Smith looked at them blankly a moment, thinking, then smiled, nodding. "Oh."

"What about you?" I asked. "What are you going to do?"

"Horace wants me to look into some problems he's having in Mutombu Mukulu."

I looked at Dolores. "I think he's a little old for that, don't you, Dolores?"

"Definitely. He should feed pigeons or something."

"What," I inquired, my expression as grave as I could muster, "did you tell him?"

"I told him I'd think about it." ■

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Paleontology: An Experimental Science

As any experimentalist will tell you, science can be *dangerous!*

ROBERT R. OLSEN

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"Computer reconstruction of fossil organisms" by L.R. Smizer (speaker), C.D. Halloran, P. McBride, H.C. Smith, and P.C. Eberhart, Geological Society of America Abstracts with Programs (Cordilleran Section), 1979, p. 14.

Advances in computer technology have recently made possible the reconstruction of fossil organisms from the organic material found in certain fossils, at least on a theoretical basis. Methods of tissue culture from single DNA molecules have recently been placed on a routine basis, but actual reproduction of fossil organisms depends on the preservation of fragments of the DNA chain as fossil material in rocks. The destructive nature of most fossilization processes suggests that only fossils of late Tertiary age can be replicated using this technique.

In cases where abundant but fragmentary material is present in fossil form, the substance is separated from the host rock and then subjected to microanalysis to determine what parts of the DNA chain are present. Analyses of the structure of the fragments are fed into a computer which attempts to match fragments of the chain in order to obtain a composite model of the DNA, which governs the form and development of the organism. New DNA can then be synthesized, either by the difficult process of building the molecule up from simpler amino acids, or, in the ideal case, by rejoining the fragments of DNA into one complete molecule. Though the latter process has recently been performed in the laboratory, it appears that those parts of the chain where the fragments were fused is always a weak spot in the structure, and susceptible to breakage in the presence of certain chemicals.

Preliminary experiments have been carried out on several species of Pleistocene land-snails and one Pliocene ginkgo. Though some of these experiments are still in the early stages of test-tube culture, two snails appear to have developed normally, as far as can be determined; and the ginkgo, recently transferred to a soil medium, shows normal growth.

"Fossils of *Tyrannosaurus nevadensis* and other saurians, Hell's Flat, Nevada" by C.C. Morrow, Geological Society of America Abstracts with Programs (Cordilleran Section), 1979, p. 19.

Excellent preservation of saurian fossils has long been known in western Utah and easternmost Nevada, and recently a most remarkable case of preservation has been discovered. In a nearly inaccessible part of the northern Shadow Peak Mountains, Upper Cretaceous rocks are exposed in a small canyon which overlooks the area known locally as Hell's Flat. The rocks, a series of continental sandstones and shales about thirty-five feet thick, are flat-lying and rest upon a surface carved in the Middle

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Cambrian Bonanza King Formation. Overlying the fossiliferous Cretaceous strata are resistant Late Tertiary volcanic and volcanistic rocks, which form the higher parts of the Shadow Peak Mountains.

The Cretaceous rocks are thought to represent a river channel cut into the older material, and consist of reddish to pale yellow, medium to fine grained sandstones and gray shales. The material is almost unconsolidated, which accounts in part for the remarkable state of preservation of the fossils.

The fossil material consists of assorted bones and skin fragments, mostly of *Tyrannosaurus nevadensis,* though three species of *Triceratops,* and an unidentified form similar to *Trachodon* but smaller and lighter in build. All fossils are the products of perfect preservation and no chemical replacement or deletion of material has occurred. The extreme aridity of the area, among other factors, has apparently caused this remarkable phenomenon; for when a skin fragment was wetted and left overnight, a strong organic odor indicative of decay was noted the next morning. The skin material is exceptionally coarse and tough, and a gray-green color.

Several pounds of this remarkable material were collected. It should prove to be of wide interest in the study of the biochemistry of fossil organisms and the geochemistry of fossilization, subjects which have not until now received the attention they deserve, due to the lack of suitable material for experiment. This lack has now been remedied to an extent.

"Computer reconstruction of fossil DNA of *Tyrannosaurus nevadensis*" by L.R. Smizer (speaker), C.D. Halloran, P. McBride, H.C. Smith, and P.C. Eberhart, Geological Society of America Abstracts with Programs (Cordilleran Section), 1985, p. 21.

Computer reconstruction of the DNA structure of the Hell's Flat fossil material has now progressed to the point where some preliminary deductions can be made as to the biochemistry of the subject organism, *T. nevadensis,* and the chemistry of the fossil material.

Although *T. nevadensis*-derived material was the most abundant fraction of fossil matter, abundant organic constituents from the other saurian remains posed a difficult problem in the early stages of preparation. However, little DNA remained from the other fossil forms, and a pure sample of *T. nev.*-derived DNA was eventually isolated by molecular probe. No complete DNA molecules were found, the largest fragment containing roughly 45 percent of the total genetic information as subsequently deduced. Other major fragments, some in slightly damaged form, contained 30, 28, 17, 12, and 8 percent of the total information necessary to reconstruct the living organism. Thus, an excess of 40 per-

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cent exists in the information as received by the computer. Analysis revealed that though this surplus of information was not as great as might be desired, all the necessary information was indeed present on the fragments.

Following computer correlation and modeling of the major DNA molecule, experimentation commenced on the actual construction and culture of the molecule. Using techniques described in a previous paper (1983), the fragmentary DNA molecules were cleaned and joined together microsurgically, the molecule being implanted in the specially prepared nucleus of the egg cell of a cayman from which the host's DNA had been removed.

Chemically induced replication of the original DNA molecule has now been attained, and the embryo placed in a life-support system. Growth is quite rapid, and the birth-analog event is scheduled for August 1986, corresponding to a gestation period of 11 months.

"Ontogeny and development of an artificial specimen of *Tyrannosaurus nevadensis,*" by C.D. Halloran (speaker), P. McBride, H.C. Smith, and P.C. Eberhart, Geological Society of America Abstracts with Programs (Cordilleran Section), 1987, p. 13.

The artificially created embryo of *Tyrannosaurus nevadensis* which has been the subject of previous reports, was inserted in a life-support growth medium on June 12, 1985, in an attempt to cause the development of a mature individual of the species. The work was performed at the Craig University Paleontology Laboratory in Hastings, California.

Though the environment of growth of course differed markedly from that which the organism would experience in its natural state, growth was rapid and proceeded normally throughout the embryonic stage. Oxygen demand increased markedly (47 percent) in the sixth month but was successfully met due to careful supervision of the environment. By the end of the seventh month, the embryo was roughly five inches long and weighed nine ounces. At this time, definite signs of electrical activity in the brain were noted, and the birth-analog event was considered to be imminent.

The young animal, a male, was removed from the life-support system on July 7th, and placed in a terrarium stocked with insects and small reptiles of various kinds. At this time the animal was eight inches long and weighed 13 ounces. Respiratory function was somewhat sluggish for the first 7 hours but then attained a condition judged to be normal for this species. The animal was from the first a vigorous and aggressive predator, and devoured two small lizards during the first day of active life.

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Seven weeks later, the specimen, now the size of a large dog, succeeded in breaking through the wire-mesh wall of the terrarium and briefly roamed at large in the Paleontology Laboratory. Several other laboratory specimens, as well as two German Shepherd dogs, were lost at this time. Unfortunately also, the struggle to recapture the animal resulted in the tragic loss of Dr. Smizer, who was first to discover the creature's hiding place.

In conclusion, despite some difficulty, significant data are now being obtained from the specimen, which has been removed from the Paleontology Laboratory to more secure quarters at the Elephant Corral of the San Diego Zoo. Data already collected indicate the necessity of revising current views on the intelligence and aggressiveness of the theropods, as well as their level of activity.

"Behavioral anomalies of *Tyrannosaurus nevadensis,* as deduced from the Smizer specimen," by C.D. Halloran (speaker), H.C. Smith, and P.C. Eberhart, Geological Society of America Abstracts with Programs (Cordilleran Section), 1988, p. 8.

An ongoing program of study at the Paleontological Laboratory of Craig University has been concerned with the production of an artificial specimen of *Tyrannosaurus nevadensis.* Following successful production of a young specimen of the species by repair of fragmental fossil DNA, the animal was placed in the Elephant Corral of the San Diego Zoo after its strength proved to be too great for conventional laboratory care.

The San Diego facilities, modified to include two double-strength steel barriers ten feet apart, proved entirely adequate for the task of containing the *Tyrannosaurus* during its youth and early adulthood, providing that adequate repair and rebuilding of the inner cage was performed weekly. With maturity, the reddish-brown mottled scale pattern of the animal's youth is being gradually replaced by a greenish-brown cast that undoubtedly had some camouflage function during Cretaceous times. Molting was accomplished once monthly during the period of maximum growth, and was accompanied by unusual patterns of behavior. Instead of the usual reptilian pattern of lethargy and passivity during the molting period, the Smizer tyrannosaurus became unusually vicious and hyperactive. It was undoubtedly due to this phenomenon, plus an oversight in the maintenance of the inner cage, that the animal was able to attain the space between the inner and outer cages on December 8, resulting in the tragic death of Dr. McBride. It was reliably reported that Dr. McBride was standing at least four feet from the outer cage when the animal seized him with a foreleg and dragged him into the cage to be consumed. Since the reach of the animal's foreleg when fully extended at

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this stage of development was only five feet six inches, it would appear that the forelegs are more useful to the creature in food gathering than was previously thought.

The great muscular development of the hind legs of the tyrannosaurus also has a significant adaptive advantage in this particular creature. It has been frequently observed that upon securing living prey, the animal will stamp and crush the prey with its feet, thus presumably rendering the food more pliant. It is thought that this behavior is related to the habit of swallowing the food in one piece as would a more modern reptile. Since the forelegs are of little use in this procedure, the rear legs have assumed the role of food-preparing devices.

"Results of computer reconstruction of DNA of the Smizer tyrannosaurus" by C.D. Halloran (speaker), H.C. Smith, and P.C. Eberhart, Geological Society of America Abstracts with Programs (Cordilleran Section), 1989, p. 27.

Since the Smizer specimen of *Tyrannosaurus nevadensis* has now reached physical maturity (although continued growth, in the manner of all reptiles, is expected), it is appropriate to examine how closely the artificially reconstituted DNA, pieced together from fragments of fossil DNA from Nevada, approximates the known genetic structure of the tyrannosaurs as previously deduced. Although certain anomalies have been observed which possibly are due to faulty reconstruction, the procedure seems to have been in large part successful, and promises to make possible further reconstitutions in the future.

Anomalies in the specimen may be divided into two classes: physical/developmental anomalies, and behavioral anomalies.

Although the Smizer specimen is now as large as the largest known fossil Tyrannosaurus of any species, the junior author feels that it has not attained full maturity; if this is so, it follows that through a defect in the DNA reconstruction, the size of this specimen is greater than it should be. This theory must wait for support with time and further growth of the specimen. The rapid growth of the animal both before and after the birth-analog event has caused some authorities to object to the speed of maturation. However, it should be remembered that since the specimen has been given sufficient or even excess food throughout its life, rapid development may be more a result of opportunity than genetic anomaly.

Though the animal exhibits behavioral aberrations as discussed in a previous paper, it is unknown whether this behavior was natural to the Cretaceous *Tyrannosaurus nevadensis* or not. Other aspects of behavior must be, as above, dependent on opportunity—as, for example, the Smi-

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zer tyrannosaurus' habit of sharpening its teeth on building concrete.

In conclusion, with the possible exception of anomalous size, the Smizer tyrannosaurus is a completely normal specimen of its type and suggests the great gains to be derived from further research into the reconstruction of fossil organisms from DNA fragments.

"Predatory habits of *Tyrannosaurus nevadensis smizer*" by H.C. Smith, Geological Society of America Abstracts with Programs (Cordilleran Section), 1989, p. 21.

Because *Tyrannosaurus nevadensis smizer* is a vigorous predator, and because of the creature's unusual size, great problems were encountered relating to the procurement of sufficient food to keep the animal both nourished and satisfied. Due to the lack of herbivorous dinosaurs of sufficient size to provide satisfactory prey for the tyrannosaurus (a lack which may soon be remedied—see Smith, in preparation, *Geol. Soc. Amer. Bull.),* smaller animals must be used. Normal behavior for the theropods is thought to have been for the creature to sleep for a matter of days after eating to repletion, after which the old kill would be revisited. However, with the artificial specimen, only small animals such as cattle and oxen were available for consumption. This resulted in a diminution of the resting periods of the creature, hence to increased activity, and therefore presumably to an increased demand for food.

Although the escape of the Smizer tyrannosaurus in March of this year, involving as it did the regrettable deaths of Dr. Halloran and Dr. Eberhart, was a serious setback to the project, it did involve unparalleled opportunity to observe the habits of the creature in a more natural setting. Fortunately, the creature proved to be very much afraid of automobiles, and while it is perhaps strange that it managed to escape from the San Diego area in view of this, the shyness on the part of the animal kept the loss of human life to a minimum.

Because of its unusual size, the dinosaur was observed by many people as it journeyed north toward Lake Elsinore. Having grown considerably by this time, the animal was forced to stop frequently for food, where it showed a definite preference for Hereford cattle. As many observers remarked, its behavior in rounding up the cattle predatory to crushing several of them with its hind legs was quite remarkable in view of the often postulated low degree of intelligence of the saurians.

Although the creature is still at large, capture is expected at any time. Since the creature has recently shown a diminishing fear of automobiles, the Lake Elsinore region has recently been evacuated, and the situation is viewed as stable. Herds of cattle are driven into the area weekly to keep the specimen from roaming too far in its search for food.

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"Death and postmortem examination of *Tyrannosaurus nevadensis smizer*" by H.C. Smith, Geological Society of America Abstracts with Programs (Cordilleran Section), 1990, p. 17.

Although the creature was naturally of inestimable scientific value, care of the reconstructed *Tyrannosaurus nevadensis* proved to be a formidable problem, particularly after its escape in March 1989. After the creature had moved north to the vicinity of Lake Elsinore, the onset of cool weather in October 1989 caused definite signs of restlessness in the animal. Finally, on November 4th, in a cold rain, the creature began to move south rapidly. It was at this point that the civil authorities requested *(People of California vs. Smith)* that the creature be put to death. Although conscious of the immense amount of data yet unacquired, the author endeavored to comply.

Since traditional methods of attack had failed, causing many needless tragedies, it was felt that the only means of subduing the beast was to use weaknesses in its own reconstituted genetic structure against it. Since it was known that slight flaws existed in the structure of the DNA, the creature was injected with K-ryocyanin at close range by bazooka. Although this treatment would have no immediate effect, it would prevent the replication of new body cells by breaking down the structure of the DNA.

However, before the animal succumbed, it nearly succeeded in reaching the Mexican border, ultimately collapsing in downtown San Diego. At this time, the creature was reliably estimated to be five stories tall (as demonstrated by the absence of fatalities or damage above the sixth floor of the Union Building). This translates to an overall length of roughly 100 feet. This measurement was confirmed when shortly afterwards the creature fell dead in the street, where it could be measured. Death was caused by cellular deterioration brought on by the injection, and occurred one week and two days after injection.

In the future it is to be recommended that more caution be used in the selection of subjects for artificial regeneration, although the process itself must be considered totally successful. In particular, the procedure will be of great value in research into the behavior of extinct animals. Preferred specimens of predators should be more intelligent, and hence more tractable, than the great reptiles. For example, there is some controversy concerning the feeding habits of the early cave bears, with some writers maintaining that they were strictly carnivorous, as opposed to the omnivorous modern bears. The Paleontology Laboratory is currently caring for an embryo of *Arctotherium californicum,* commonly known as the giant cave bear, developed from fossil material found at Rancho La Brea; after the animal is born this fall, answers to this and many other questions will undoubtedly be found. ■

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the reference library

P. Schuyler Miller

CONVENTION TIME

My apologies to you, and to the convention committees, for not keeping you up-to-date on the World Science Fiction Convention. It will be held Labor Day weekend, August 29 through September 2, at the Sheraton-Park Hotel, Washington, DC. Roger Zelazny is guest of honor and banquet speaker. The annual Science Fiction and Fantasy Achievement Awards ("Hugos") will be made there, as will the second John W. Campbell Award for best new writer in the field, and a new Grand Master of Fantasy Award ("Gandalf" Award) in memory of the late J.R.R. Tolkien. This, like the Science Fiction Research Association's Pilgrim Award, is made for an outstanding career in the field.

(I am especially apologetic that I did not report that the 1973 Pilgrim Award went, with something like universal acclaim, to veteran SF writer, teacher, and student of H.G. Wells, Jack Williamson. As the first award to someone who is not primarily an academic, it broadens and enriches the award substantially.)

All the established features are on the program: a fabulous costume party (sworn to outdo Toronto's), the ever-improving art show that was launched in Pittsburgh in 1960, a program that people actually attend, introductions to top writers and powers in SF fandom, and the "hucksters" room where you will find rarities you never heard of. Oh yes—there's a babysitting service and a special $1.00 rate for kids. And an auction catalog, of all things!

Bids for the 1976 convention, presumably in the Midwest, will come up for a vote. The 1975 convention will be in Australia, in Melbourne, on August 14-17, 1975, with Ursula LeGuin as guest of honor. Memberships: $3.00 supporting; $10 attending. If you have a hope in the world of getting to Aussiecon 75, the committee's US agents are Jack Chalker, 5111 Liberty Hts., Baltimore, MD 21207 and Fred Patten, Apt. 1, 11863 W. Jefferson, Culver City, California 90230. In Canada: John Millard, PO Box 4, Station K, Toronto 12, Ontario. To go direct, it's Aussiecon, GPO Box 4039, Melbourne, 3001, Victoria, Australia.

THE ENCYCLOPEDIA OF SCIENCE FICTION AND FANTASY THROUGH 1968

Compiled by Donald H. Tuck • Advent: Publishers, PO Box 9228, Chicago, IL 60690 • Vol. I (1974) • 286 + xii pp. • $20.00

One of the landmarks of science-fiction bibliography has been the "Handbook of Science Fiction and Fantasy" compiled and published

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by the Tasmanian scholar (like his counterparts in the States and elsewhere, he has to be given a better title than "fan"), Donald Tuck. The first version of "Tuck's Handbook" came out in 1954; and an expanded two-volume edition appeared in 1959. Tuck also brought out a series of extremely valuable single-author bibliographies that set new marks in the field.

Now the Chicago SF specialty publishers, Advent (like Tuck they deserve a better name than "fan"), have begun to publish a hardbound expansion and revision of the "Handbook," in three volumes. Because of printing costs, it is aimed mainly at libraries, especially university and reference libraries, but series collectors will have to have it. Volume I, which I have seen in unbound pages, covers authors whose names begin with letters from A through L. Tuck calls it "Who's Who and Works." Volume II, scheduled for 1976, will cover M through Z and include an invaluable listing by title that promises to supersede the great Bleiler-Dikty "Checklist of Fantastic Literature," which was reprinted last year by Fax (Ted Dikty with new partners). Volume III (1977) will have accounts of the SF and weird/fantasy magazines, including many borderliners, plus a paperback listing, plus a directory of pseudonyms, plus a breakdown of connected series and stories (such as the Heinlein "Future History" and Poul Anderson's vast tapestry), and a section on publishers, outstanding films, fanzines, and a big "et cetera."

I have not seen the reportedly fabulous French encyclopedia of science fiction and fantasy which was introduced at the Toronto convention last Labor Day. At reported prices in the vicinity of seventy-five dollars, I am not likely to; in any case, I can't give you a source or a firm price. But, apart from illustrations, Tuck's encyclopedia is going to cover much of the same ground—except possibly for European rarities—and in English.

For novels, the encyclopedia begins with 1945, where Bleiler and Dikty stopped, and comes up through 1968 (when Tuck had to finish off Volume I and tie up his loose ends for Advent). It picks up some older books that the "Checklist" missed; it covers everything that was reprinted in *Famous Fantastic Mysteries;* and it picks up all novels of the more important writers, but it does not really dig into the past, unless a book has been reprinted in the 1945-1968 era. It includes many foreign-language editions.

Coverage of collections and anthologies is a good deal more complete, and will make the encyclopedia worth its price to many students and collectors. Tuck has ferreted out lists of the contents of 1550 one-author collections and 950 anthologies, some going back to the 1890's. The "Who's Who" includes paperback editions of major books; Volume III will list many more that aren't major.

You also get, for many, many entries, capsule descriptions of a book, and other relevant data.

The encyclopedia has been a

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truly international project, with help acknowledged from Switzerland, Spain, Germany, Austria, Sweden, and Japan as well as England, the US, Canada, and of course Australia.

I used the loose pages of Volume I to settle half-a-dozen arguments and dig out data on as many books the day I got it. I expect to use it many more times. Typography is generally good and clear; my one real gripe is that Advent chose, or its printer decided, not to provide some space between titles in long series of entries. Titles are printed in boldface type, but even so, they are hard to pick out. On the other hand, all that extra space would have added up fantastically over a thousand pages or so, and might have made it necessary to go to four volumes and a possible eighty dollars.

If Tuck rests on his laurels—and after twenty years or more (*much* more) he could hardly be blamed—who will, who *can*, carry on from 1968? He and Advent both ask for corrections and omissions. Somebody is going to try.

A SPACESHIP FOR THE KING
by Jerry Pournelle • DAW Books, New York • No. 42 • 157 pp. • 95¢

No, faithful reader, that hard-nosed individual Kelly Freas has painted on the cover of Jerry Pournelle's first book is not the author. It is Colonel Nathan MacKinnie, late of MacKinnie's Wolves and hero of a yarn that you read here a while back. It and others like and unlike it (Jerry Pournelle thinks his still uncollected short fiction is better) won him a special award made in memory of John Campbell, as the "best" new SF writer of 1972.

If you have only just picked up Analog, the story is set in a future cast in the image that Poul Anderson and Gordon Dickson have explored most thoroughly in many stories. Mankind has spread to planets among the stars, has been gathered under the hegemony of an Earth-centered empire, which is in turn breaking up. The people of Prince Samual's World have been drubbed by the Imperial Navy, and seem doomed to perpetual extinction, since all they have to interest the Empire is a local wine. If they can build a spaceship and come to meet the Navy in open space, then they may be admitted to the fellowship of free peoples, but the chances are small.

Only—the Navy has discovered another forgotten planet which still has the remnants of an Imperial library of the expansionist era. It contains plans for a spaceship, and a good deal more—but how are Samualites to cross space, breach the temple/fortress housing the library, and get its secrets home again. The king enlists the erstwhile rebel, MacKinnie, to do it . . . and he very nearly has (but not quite) as the book ends. There will certainly be a sequel.

Jerry Pournelle is not yet Anderson or Dickson, but he is moving fast in good company. He makes a future feudal society believable, shows us some new facets, and keeps things moving. He obviously loves sailing more than MacKinnie does, but that is a minor flaw.

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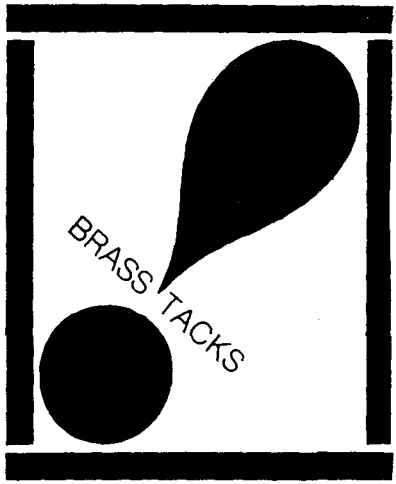

Dear Mr. Bova:

For a good many years, the only fiction magazine which I have purchased and read regularly has been Analog (Astounding). The reason for this being that only in this magazine have I been able to find good, clean, sensible, entertaining stories. One by one, the other magazines have gone to the modern brand of idiocy, until they are no longer readable.

It is with a great deal of sorrow that I find that Analog has finally followed the pack. For some time now, your stories have been trending toward the filthy, senseless garbage that is currently dished up from all sides. If the argument is advanced that sex is an integral part of the story, then since there is nothing else in the story, it follows that it is pornography pure and simple.

As a matter of interest, I would like to refer to the letter from A. George Senda, published in the June 1973 Analog. He writes: "I have smoked marijuana numerous times (as do a number of prominent and nonprominent SF fans and writers) . . ." Could *this* have any bearing on the fact that we now get such rotten science-fiction stories? I am afraid it might.

Now, sir, I know that you are already concocting one of your usual smart-aleck replies, intending to show that I am stupid, while on the other hand you are real smart. I have one answer, however, which is, I think, better than any you can come up with. I have recently received notice that my subscription is running out. I can only say "Thank God!" I strongly suspect that I have read my last Analog.

Please receive my heartfelt curses for your part in ruining the last of our fiction magazines.

HAROLD HECKART
Mathematics Department
Winona State College
Winona, Minnesota 55987

Without trying to be a smart-aleck, my position is that Analog publishes stories that have strong idea content, phrased in the most vital language that the writers can produce. We want stories that involve and intrigue the reader, stories that are not rehashes of what was done twenty years ago, nor even "now" kinds of tales. We want stories about tomorrow: realistic, hard-hitting stories that explore how real human beings will behave in all the myriad tomorrows that might be. As for my feeling about marijuana, please see my Editorial in the November 1972 issue.

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Dear Mr. Bova:

This is a request that some of the people who made "excellent" on the chemistry test in your April issue contact me immediately. I'm sure they could assist me with certain problems in mathematics I have encountered while developing a faster-than-light drive.

JEROME A. SMITH
2759 Leisure Drive
Fort Collins, Colorado 80521

Many of our readers found that getting an "excellent" grade on the April chemistry quiz was an impossible dream—thanks to a last-minute change that wasn't corrected in time. We apologize for the goof-up.

Dear Mr. Bova:

Science fiction can be used in a number of ways as a part of the educational enterprise. Scientific concepts, alternate futures, social systems, literary devices, et cetera, are all amply demonstrated by the genre known as science fiction and are all legitimate areas of study in the public schools; but there is a basic problem involved in increasing the amount of science fiction used as an educational device in the schools. Literally thousands of novels, novellas, and shorter works of science fiction have been published just in the last twenty or so years; much of this is inadequate as either literary art or teaching device. The overworked, underpaid classroom teachers usually don't have much time or energy to devote to searching for new teaching materials; therefore they depend to a great extent on previously compiled teachers' guides and other compilations of available materials to aid them in their search. The teachers who *do* try to develop their courses beyond a set of curricular materials furnished them by their administrators (these are the "good" teachers who spend sixty to eighty hours per week at their jobs) are almost totally dependent on bibliographies of this type because of the previously mentioned time constraints.

I know of no guide of this nature which could be used by teachers to find science fiction appropriate to their classroom objectives. This was brought to my attention by some research I was doing in writing a resource guide for environmental education. A published bibliography listed an exhaustive compilation of general and specifically juvenile fiction related to environment, ecology, conservation, and similar topics. I immediately noted the conspicuous absence of Bradbury's "A Sound of Thunder" which I have used in conjunction with teaching environmental topics in the schools. A close examination of the list revealed *no* science fiction at all despite some truly excellent work based directly on ecological themes. Because of this experience, I have another bee in my already overpopulated bonnet: I want to write a science-fiction resource guide for secondary educators.

I would like to ask the help of your readers in this project because I am certain that many of them are much more knowledgeable about science fiction than I am. If you readers would, please write and de-

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scribe for me stories *you* would recommend for educational purposes (Asimov's "The Gods Themselves," a short story "Susie's Reality" that I'm trying to chase down, Silverberg's urban monad stories are all examples of stories with science and/or social science content that *I* believe are readily applicable to developing important concepts in classroom situations). List the bibliographic info for each story, give a short description of its science or social science content and theme(s), and also include a word or two describing its literary as opposed to its didactic merits. If any of you know of an SF resource guide, *please* write and tell me where I can get it. I am especially interested in ecology and environment-related stories right now so that I can include them in the environmental education resources guide. Thanks for help any of you might be able to give me.

WILLIAM G. LAMB
Science Education Center
EDA F-11
University of Texas
Austin, Texas 78712

A science-fiction resource guide would be invaluable to writers, readers, collectors and fans, as well as teachers and students. But there are some major problems to contend with. First: such a guide would quickly become dated. Second: although the help of interested readers would be invaluable in getting the guide started, there is no substitute for long and arduous hours of reading, analyzing, searching, and THINKING, which must be done by the one person who is committed to making the guide a useful tool. For what it's worth, Analog author Stanley A. Schmidt (who teaches physics at Heidelberg College, Ohio) has made a good start toward such a guide in an article he published in the American Journal of Physics, *September 1973 (Vol. 41, pp. 1052-1056).*

Dear Mr. Bova:

Mr. A.E. van Vogt's letter, in the March issue, contains sentiments quite similar to mine.

With his science-fiction library and proposed museum, Mr. Forrest J. Ackerman is doing a great service to science fiction and to us all! A collection such as Mr. Ackerman's should be important to every SF fan and writer, containing as it does, the history of this field. Everything important that has ever been written in, or about science fiction, is there that all may see. I agree with Mr. van Vogt that we, the people of science fiction, should assume at least some of the burden for the maintenance of this collection.

But I would like to go one step farther. I would like to propose that at the next Worldcon, an award much like the Hugos be instituted, to be given at each convention to the person who has done the most during the preceding year to promote science fiction. I suggest further that this award be called the Forrest J. Ackerman Award, and that its first recipient be Mr. Forrest J. Ackerman.

Some might think this a little ostentatious, but what more can be expected of a man? After his de-

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voting so many years, and so much money to the good of the field, it is the least we can do! Moreover, I see no reason why Mr. Ackerman should be required to die before the awards are begun. Hopefully, he will live for a long time to come, and we need such an award now, to hold science fiction together and help it grow.

Much to my regret, I will be unable to attend the next Worldcon. Therefore I would sincerely appreciate it if someone else took it upon himself to have this brought to the attention of the Worldcon committee, and championed the cause at the convention.

FRED M. CIVISH III
423 Pleasant Court
Salt Lake City, Utah 84101
Are there any champions reading?

Dear Mr. Bova:

Just a few days after I sent my last letter, I read the short story by Brian C. Coad, "A Bonus for Dr. Hardwick." It parallels my own views closely. At one time I worked at such a place, which differed only in its smaller size, and in that the guards were more human and intelligent than the management. I had at that time made friends with most of them. Also they knew more about the business than the "management" did. The technical details of this flying circus were the same, including the fence around the place and punishment not only for creativity, but even competent work. The analogy about their sole major activity of draining vitality was especially apt.

The observation that competent persons are initially defeated with ease through their own innocence is also correct; however it is also true that once such a victim is fully aware of how bureaucratic procedures are set up and how they work, any appropriate counter-attack can be ridiculously easy and effective. I would like to see more of Mr. Coad.

CONRAD I. SCHLUM
6257 South Comstock Avenue
Apt. H
Whittier, California 90601
Countering bureaucratic procedures isn't all that easy, despite a few notable successes such as Admiral Rickover.

Dear Mr. Bova:

Re: your Editorial "The Experts" in the March issue. Why are we so frightened by the way others might see us? Any extraterrestrial life that may come to Mother Earth and is far more advanced than we will no doubt have had to come up the ladder of progress as we did. Surely if we show signs of pushing onward instead of bemoaning our fates, we'll be able to get by. I do get a little tired of being told of man's fallen state all the time. While true, we still have a lot to be thankful for.

Heck, maybe someone like Isaac Asimov would make a better ambassador than these so-called experts.

Get your heads out of the sand, the future is up There!

RAYMOND J. BOWIE, JR.
31 Everett Avenue
Somerville, Massachusetts 02145
Isaac? In striped pants?

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Dear Mr. Bova:

I've wanted to say some things about the energy situation for some time, and you made it easier by taking some of the words out of my mouth . . .

The rest of the April issue inspires some comment, too. "Earth, Air, Fire and Water" is a good action yarn, and does a good job of illustrating why the concept wouldn't work; it gives the enemy too much time to invent a counter-weapon. "Hot Spot" was a bit puzzling. I hate to say it, but it reads like some of the reprints Ted White used to run. Good, hard, science-fiction core, but awkwardly written. The geologist, especially, was too self-conscious to believe, and it kept jarring me as I read along. The language struck me as more characteristic of theatrical people than scientists and pilots.

"Scholarly Correspondence" would have been the funniest thing in almost any other issue; unfortunately, it had "The Time-Traveler" for competition. Both really deserve a best-of-issue. A question: are there really people who can pun fast enough to take turns? I thought it was quite a feat when the group I used to get together with for dinner at school used to do it in random order with no fixed topic. As for the ghost story, a probability wave length of ten centimeters ought to guarantee an early escape through a door or window, especially with thermal agitation at work. It was a lot of fun to see somebody playing games with modern physics.

JOHN A. CARROLL
311B Washington Street
Norwood, Massachusetts 02062

Yes, there are punsters fast enough; Spider Robinson himself is one of them.

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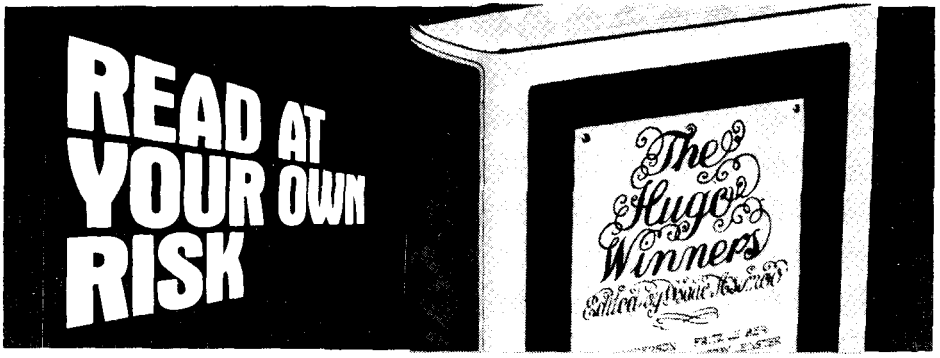

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